PMI

VOL. 1 NO. 9
SEPTEMBER
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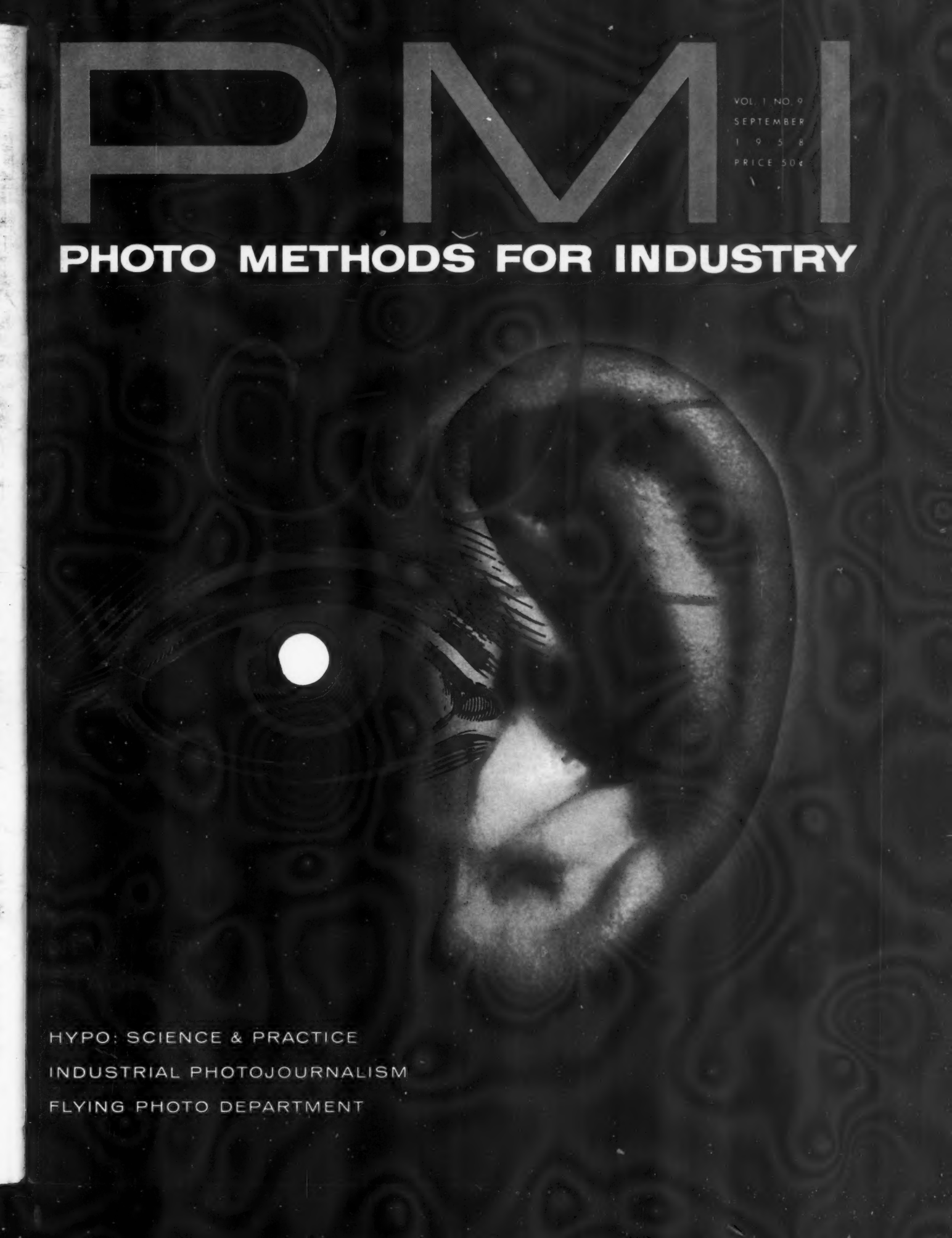
PHOTO METHODS FOR INDUSTRY



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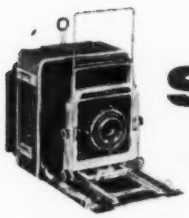

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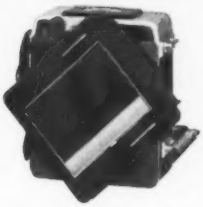

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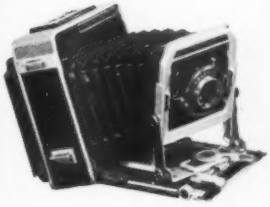

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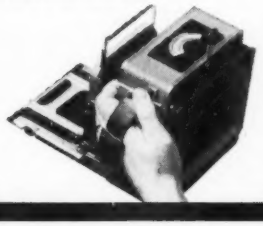

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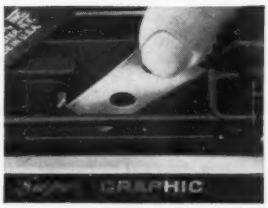

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Get more information. Circle 433, page 59

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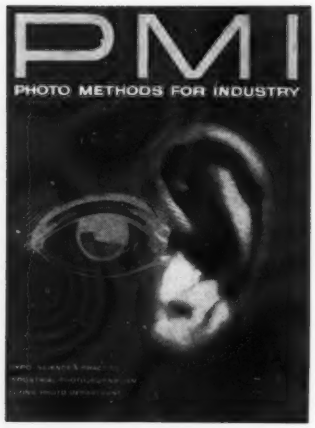
SEPTEMBER, 1958

VOL. 1 NO. 9



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FEATURES

23 EDITORIAL
Craft & sell, he needs both

24 INDUSTRIAL PHOTOJOURNALISM
Western Electric's Morris Gordon states his views

28 PHOTO FIXING: SCIENCE & PRACTICE
Eugene Ostroff's eye-opening analysis

32 PORTFOLIO NO. 7
Torkel Korling makes tough assignments look easy

36 PHOTO DEPARTMENT ANALYSIS NO. 9
Lockwood, Kessler & Bartlett, Inc., flying photo unit

40 TECHNIFAX'S A-V SCHOOL
New Visucom Course is offered gratis

42 NEW YORK STAGES A-V WEEK
Industrial A-V users convene, show their wares

44 READER'S SHOWCASE
Two pages of choice industrial pictures from PMI readers

DEPARTMENTS

6 FYI
A column of personalities and news for your information

7 LETTERS

10 REPRODUCTION & GRAPHIC ARTS *Herbert P. Paschel*
Photo-Screener Transducer; Scan-A-Graver newspaper color system

12 METHODS FOR TOMORROW *Lloyd E. Varden*
Photo-copying practices and the copyright laws—a short review

16 INDUSTRIAL COLOR *Samuel Lang & Leonard Zoref*
Super Anscochrome, Tungsten Type, fastest and handiest color film on the market

18 ELECTRONIC FLASH *Edward R. Farber*
Manufacturers bring out surprise packages for the photog

20 PHOTO INSTRUMENTATION *Ernest E. Reshovsky*
New equipment for photographing at intervals and around corners

46 SCIENCE NOTES

48 INDUSTRIAL MOTION PICTURES *Arnold Eagle*
It's sync or swim when beginners plunge into sea of sound systems

50 SAFETY SNOOPSHOTS

52 PHOTO BOOKS IN REVIEW

53 IN-PLANT TEST
Flip Schulke tries Nikon's new extension holder

58 FREE LITERATURE
Booklets, folders and data—yours for the asking

61 NEW PRODUCTS
What's new in the market for the photographer in industry

66 PHOTO METHODS IN USE

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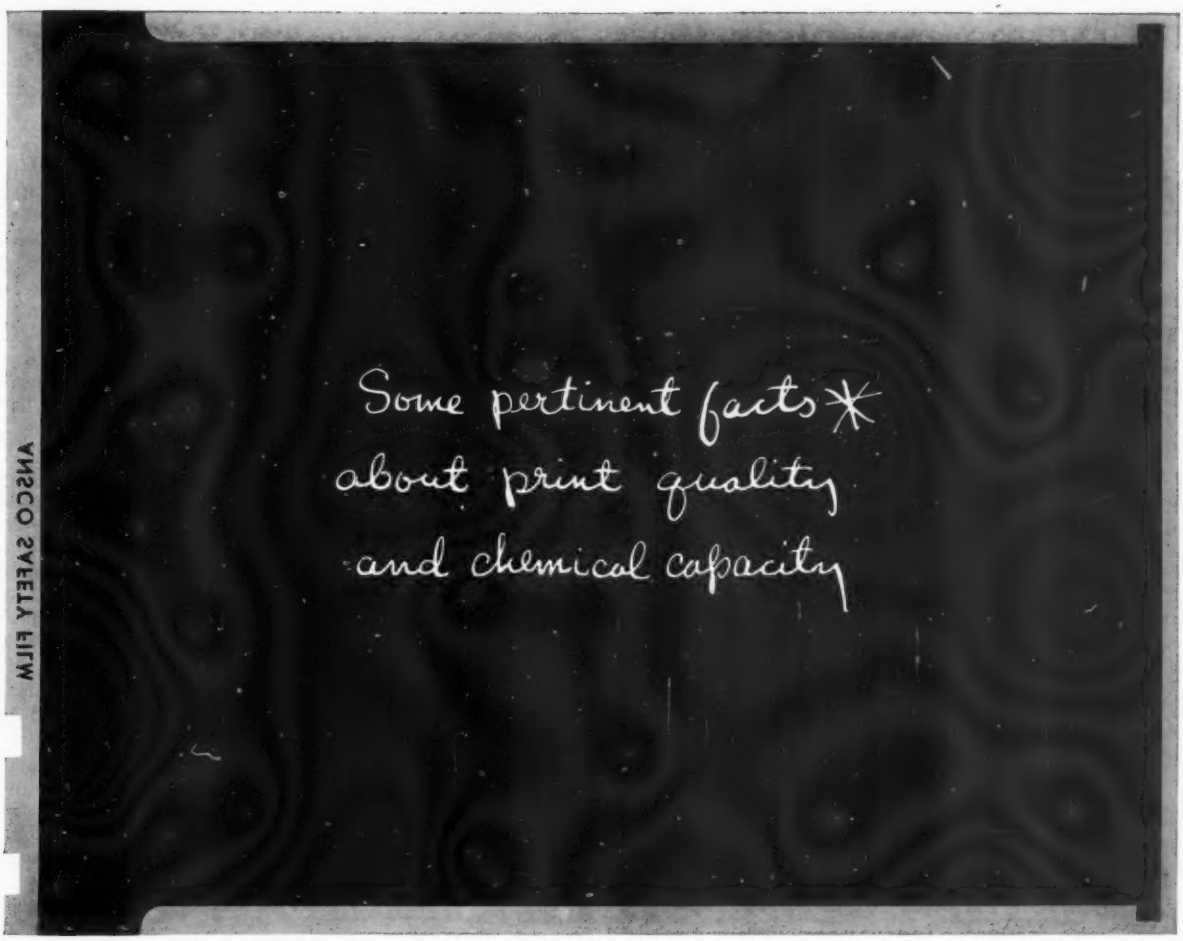

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Get more information. Circle 405, page 59

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F.Y.I.

That old projector that's been banging around the stockroom since 1933 may be worth a new projector to you if it's the right kind.

The Victor Animatograph Corporation wishes to locate the ten oldest Victor 16mm sound-on-film projectors still in use, and offers to exchange them for new Victor Assembly 10 models at no cost to the owners of the old projectors. The offer is being made in conjunction with the twenty-fifth anniversary of their introuction of the world's first 16mm sound-on-film projector in 1933. Anyone possessing an early Victor sound-on-film projector still in operating condition is invited to send its description and serial number to the Victor Animatograph Corporation, Plainville, Connecticut. The ten oldest projectors, as determined by manufacturing records, will be exchanged for new Victor Assembly 10 models at absolutely no cost. The offer expires on December 31, 1958.

Another free offer

Nikon Inc. announce that "if the individual who made off with the Nikon camera and motor (and we respect his taste in fine equipment) at the recent PP of A convention will contact us, we would like to give him the connecting cord and battery cases so he can get full value from the outfit."

The address is 251 Fourth Ave., N. Y., you crook.

Cold comfort

If you're worrying whether your stocks of medical X-ray film will be fogged in the event of a nuclear war, stop.

According to a report by Dr. Heinz Nitka, of the Ansco Research Laboratory, Binghamton, N. Y., "The sensitivity of medical X-ray film in its original container to nuclear radiation is approximately 1/1000 of the sensitivity which the film assumes when exposed to diagnostic X-rays while in contact with intensifying screens. [The standard technique, *Ed.*]

"Near ground zero of a nuclear explosion medical X-ray film and equipment are rendered useless. However, general destruction in this area is so complete that no means for medical radiography would be available, regardless of what radiographic system would be used."

Picking up the pieces

In July's PMI, the table of automatic slide projectors omitted the first automatic slide projector: the Selectroslide, manufactured by Spindler and Sauppe, 2201 Beverly Blvd., Los Angeles 57.

Selectroslides come in three different sizes, for 16, 48 or 96 slide continuous capacity. (The 96 slide model is temporarily discontinued pending a new model). The 48 and 96 slide models utilize steel slide holders and all projectors are continuous automatic or remote control.

The following month, in the article devoted to Robert Fuhring's brilliant photographs of engineers and scientists at work, the writer in one place speaks of Fuhring's specializing in bounce electronic flash; in another, of his using photofloods in clip reflectors. The solution to this apparent contradiction is, of course, that Fuhring uses both, as conditions require.

We would have had the author flogged but he has left PMI to become Fungus Editor of *Popular Cheesemaking.*

Association items

Evidence of the growing stature and importance of competent repairs and services to the photographic industry has been impressively underscored with announcement of the formation of the National Association of Photo Equipment Technicians.

Recognizing the increased complexity, growing use of electronic circuitry and greater precision construction inherent in today's photo equipment, NAPET feels its members have a vital role to play. Members of the association will be able to pool their knowledge and will be in a position to recommend a uniform method of handling repairs and services. Another objective of the association is a closer working relationship (*Continued on page* 52)

LETTERS

To the Editor:

In my estimation, Winter Prather is one of the finest photographers in America. His insights into the esthetic possibilities are profound and continued with a sure technique.

The subjects for his camera as reproduced in your July, 1958 issue, were of architecture. As the architecture was obviously of recent origin, I feel that it was inconsiderate of your magazine not to publish the name of the architects.

The Mile-Hi center is by architect, Pei. Tropics, Fontius and the restaurant interior are by our architectural office. The auditorium interior is unidentified.

All photographers seek credit in architectural magazines. Why shouldn't the architect receive credit in photographic magazines.

Richard L. Crowther
Denver, Colo.

He should. The auditorium, photographer Prather says, was one of architect Crowther's own projects
Ed.

To the Editor:

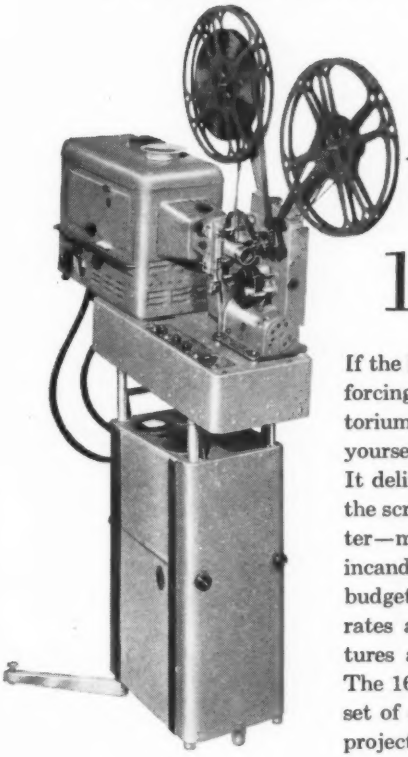
We read with interest the article titled "What About Magnetic Sound," appearing in the June issue of PMI, written by William H. Deacy.

The thought occurred that perhaps you and your readers would be interested to know that the Radio Corporation of America manufactures and markets three models of 16mm sound motion picture projectors designed for standard optical sound reproduction. These equipments are identified as the RCA "Life-Tested" Junior, the RCA "Life-Tested" Senior, and the RCA Porto-Arc.

We have available through the RCA authorized Audio-Visual Dealers a simple accessory kit, which when added to the above-mentioned equipments, will convert any of these units to reproduce magnetically striped film. These kits carry a suggested list price of $125 for the Senior and Porto-Arc models and $143 for the Junior model. These kits were introduced several years ago to satisfy the need expressed in Mr. Deacy's article, and many hundreds of them are installed in optical projectors and are in use throughout the country.

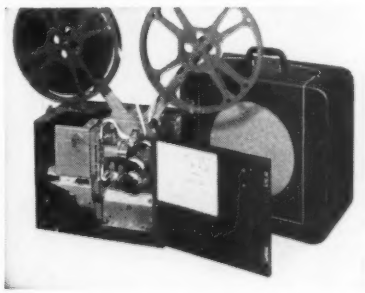
W. D. Osborne
Radio Corporation of America
Camden, N. J.

GET MORE FOR YOUR PROJECTOR DOLLAR



VICTOR 1600 ARC

If the high cost of 16mm arc projectors is forcing you to "make do" with an auditorium-type incandescent—you owe it to yourself to consider the Victor 1600 Arc. It delivers a full 1600 lumens of light on the screen at 30 amps with Mark II Shutter—more than three times that of any incandescent—yet it's still easier on your budget than other 16mm arcs. It incorporates all advanced Victor projector features and a powerful 25-watt amplifier. The 1600 Arc runs for a full hour on one set of carbons, does not require a special projection booth, and is the only arc projector made with 3-case portability.



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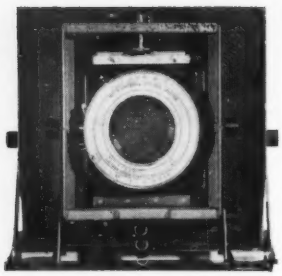


Industrial

Look What's Happened to Photography!

Faster, finer-grained black-and-white films . . . two new variable-contrast papers . . . new surfaces in familiar papers . . . the full evolution of the negative-positive concept of color photography . . . new 35mm color . . . new negative color sheet films . . . a new panchromatic paper . . . a change of name . . . and significant advances in controlled agitation.

Comes the revolution

Time exposure is hardly new in photography. The first photograph ever made was a time exposure. It was a crude and all but unrecognizable "picture" of the rooftops of Paris.

Early portraits, too, required exposures timed in *minutes*. The poor victim sat transfixed in a cast-iron head rest that kept him from turning into a blur.

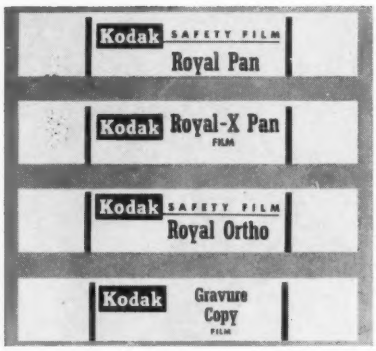
Daguerreotype—1850

Today, natural-light exposures are measured in small fractions of a second. Even "available darkness" exposures are short, apertures small. All of which greatly simplifies problems of subject movement and depth of field.

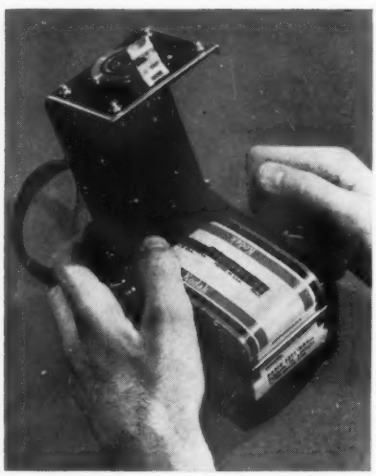
But, to get where we are now, huge strides in emulsion technology were needed. Rising to the occasion, Kodak research developed the materials on these pages—materials which did not exist a couple of years ago. Now you can go out with Kodak Royal Pan or Royal Ortho Film and make negatives at the fast speeds and small apertures which make for professional quality without sacrificing fineness of grain and long scale.

Time was when a film with a working index of over 1600 was something out of a pipe! Now, of course, you can get Kodak Royal-X Pan Film in sheets, rolls, and the ever-useful 4 x 5 film packs to make such dreams a reality.

Even the sedentary art of making good copy negatives has been revolutionized. A newcomer, Kodak Gravure



Copy Film, astonishes even its creators by the way it performs, particularly in bringing much-needed life and detail to highlight areas.



Small cameras today are just as professional as the "big guns." For conventional assignments requiring a medium-speed material, there is Kodak Verichrome Pan Film. Kodak Panatomic-X Film takes care of situations calling for microfine grain.

The man behind the 35mm camera also has Kodak Panatomic-X Film with its high acutance, fine grain, and ability to yield mural-sized blowups. And there's BRAND-NEW Kodak Plus-X Pan Film with its medium grain and speed to handle the medium-range chores in 35mm.

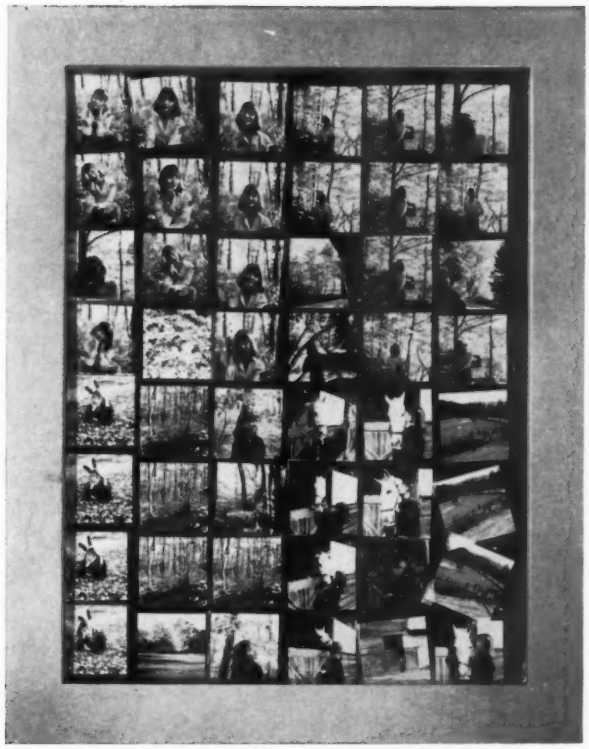
Roll-film partner of Royal Pan is Kodak Tri-X Film. It offers the moderate grain, high speed, and wide latitude so needed for general-purpose work, especially where lighting is poor. Tri-X comes in 135, 120, and 620 sizes, to name those commonly used by professionals; also in film packs.

New black-and-white papers, too

Your print—the photographer's ace ambassador—comes to life under the enlarger—*the final print*. It tells the world what you can do. So, to do you and your negatives full justice, there is the well-known and universally respected Kodak Medalist J Paper.

But now, also, there are the two new Kodak Polycontrast Papers—variable-contrast materials of superlative image tone, excellent gradation, fine reproduction quality. Polycontrast Filters make each box a full stock of 7 contrasts. A real boon to those responsible for purchasing paper stocks. And a boon for the busy darkroom technician who wants what he needs when he needs it. Kodak Polycontrast Papers—for professional results.

Round-up



You can proof color negatives quickly and conveniently on large sheets of Kodak Ektacolor Paper.

New concepts in color

The revolution in color has been even more eye-opening than that in black-and-white. Heart of the change is the *color negative*. In sheets, it's Kodak Ektacolor Film, Type S and Type L (for "short" or "long" exposures). For roll-film cameras there is dual-purpose Kodacolor Film, balanced for both daylight and clear flash, without filters. And if you want positive color transparencies from any of the above, there is Kodak Ektacolor Print Film. Make slides for projection, too, from the same negative.

The positive printing medium for negative color films has been until recently called "Type C." Now, same paper, same performance, it has been integrated with the Kodak color family by getting a new and more suitable name: KODAK EKTACOLOR PAPER.

Packages of the material may carry either name for a bit, until our supply of the packaging is exhausted. Either name—same quality, same product.

In any case, the positive color print—once achievable in first-class reproduction quality only from a transparency via the Kodak Dye Transfer Process—is now less difficult to make and less expensive than ever before. In short, the fine color print is now as practical a medium for the working professional as for the color specialist . . . with the new Kodak negative color films and KODAK EKTACOLOR PAPER.

While we're on the subject of negative color, don't forget that you can now get Kodacolor Film for your 35mm camera, too. Studio camera, press camera, roll-film camera, 35mm—there is negative-positive color all the way.

New aid to quality control

We don't make tanks like the one below. We don't use tanks like the one below. We publish this picture again because it dramatizes the new aids to quality control in color processing which have

come along with the new color materials. You can use Kodak-pioneered nitrogen burst agitation like this in your own lab—or if you have your color processed outside, it is available to your finisher.

Of course, nitrogen burst agitation is a technique for processing black-and-white, too.

Shades of gray, even in the color lab!

One last thing was needed to complete the negative-positive family . . . the means to render the negative color image as a corrected black-and-white print.

Hence, Kodak Panalure Paper. Its panchromatic emulsion holds the natural tonal relationship of lips, eyes, hair, to skin—also allows you to darken skies with filters, lighten certain colors, beef up clouds, etc. All in the darkroom!

Your Kodak dealer can answer questions, help with problems, and supply all the exciting new materials discussed here. Your Kodak technical representative is ready to help, too. Or, you can write right to Kodak for information and literature, if you like.

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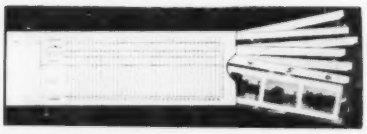

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No. 350-A-00. Same as above, with 300 No. 35-A-6 Nega-Tubes with Index. $89.45

No. 22-3-G-00. For 300 No. 22-3-G Nega-Tubes or 1,200 exposures (620 film.) $59.95

No. 22-3-A-00. Same as above, with 300 No. 22-3-A Nega-Tubes. $104.45

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by Herbert P. Paschel

REPRODUCTION & GRAPHIC ARTS

Photo-Screener Transducer; Scan-A-Graver newspaper color system

In view of the variables associated with the conventional methods of making halftone images (see Graphic Arts Variables, PMI, August, 1958), the development of an electronic halftone camera is interesting news.

Such a camera was disclosed by Dr. Samuel W. Levine, Fairchild Graphic Equipment, Inc., in a paper presented before the 10th Annual Meeting of the Technical Association of the Graphic Arts.

The laboratory model described is a modified engraving machine, the Fairchild Scan-A-Sizer, in which the regular engraving stylus is replaced by a "Photo-Screener Transducer." An optional addition to the electronic circuitry is the Variable Response Unit by means of which the scan information can be modified to obtain specific and variable reproduction characteristics.

The Scan-A-Sizer, which has been described in detail previously, (PMI, January, 1958), scans the copy line by line and converts density values into electric impulses. The Photo-Screener transforms the amplified and modified signals into shaped dots of light whose size varies according to the original densities. The dots of light are focused, line by line, on high contrast film in synchronization with the copy movement.

The Photo-Screener, *Figure 1,* is a unique electro-optical device. Briefly described, a chevron-shaped beam of light is directed to a galvanometer mirror from which the image is reflected to a special prism. Interposed between the prism and mirror is a knife edge. At zero signal the galvanometer mirror images the chevron-shaped aperture so that the tip of the chevron is slightly below the knife edge and no light passes into the remainder of the optical system. Upon an appropriate signal from the scanner section the galvanometer mirror is actuated, permitting the aperture image to appear above the knife edge. The size of the aperture showing above the knife edge is in accordance with the density of the copy area being scanned.

The shaped beam of light passing above the knife edge then enters a special prism, *Figure 2,* where it is split into two parts. By virtue of the construction of the prism, one image is inverted in respect to the other. The two image bases join to form a symmetrical, diamond-shaped dot of light which is focused on the recording film.

According to Dr. Levine, an elec-

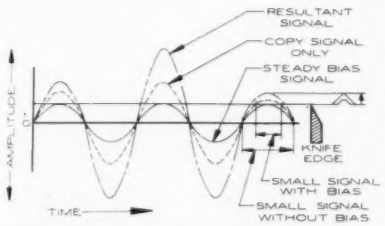

Figure 1 Schematic functional diagram of the Photo Screener Transducer

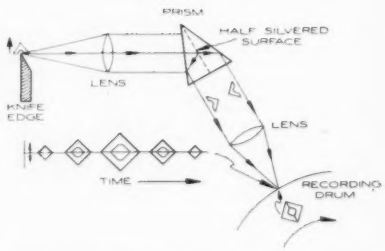

Figure 2 The special prism of Fairchild's experimental first unit splits the aperture image in two and subsequently recombines the separate images to form a square dot of light.

tronic halftone camera has numerous advantages. The halftone images so produced can be either negative or positive; left or right-reading. Modification of the density relationship between original copy and halftone reproduction is possible within wide limits with automatic control of minimum and maximum dot size.

Since dot recording is line by line, screen rotation necessary for color work is too complex to be practical and the present design limits the machine to black-and-white work. The company does not plan manufacture of commercial models until such time as sufficient interest and demand is indicated by the industry.

Scan-A-Graver color

A reader asks, "Can a practical system for newspaper color be worked out using the Scan-A-Graver?"

If the problem of maintaining registration of the three plastic engravings can be overcome, a very simple and practical system is indeed possible. The news shots would be photographed on negative color film (Ektacolor, Kodacolor, etc.). Separation positives would be made directly from the color negatives on Kodak's relatively dimensionally stable panchromatic paper (Kind 1489, a special order product). The resulting black-and-white prints would each be converted to engravings in the Scan-A-Graver. The necessary screen angle for each color (to prevent dots from printing one over another) would be accomplished by angling each print when mounting on the scanning cylinder. This cuts down on the usable image area since the diagonal of the image must not exceed the shortest dimension of the machine's rated capacity.

The distortion of the plastic used for the engravings due to mounting tension and the effects of engraving make precise registration of the three separates somewhat uncertain. But with proper care in handling, and by keeping the image size below 6 x 8 in., the register problem may prove to be negligible. The coarse screen ruling normally used in newspaper printing will further minimize any noticeable misregister.

The above would result in an extremely straightforward color printing system—from subject to printed reproduction without any unnecessary intermediate steps. Color correction could be introduced by masking the color negative, altering density of separation positives and by retouching the separation positives. (*Continued on page 67*)

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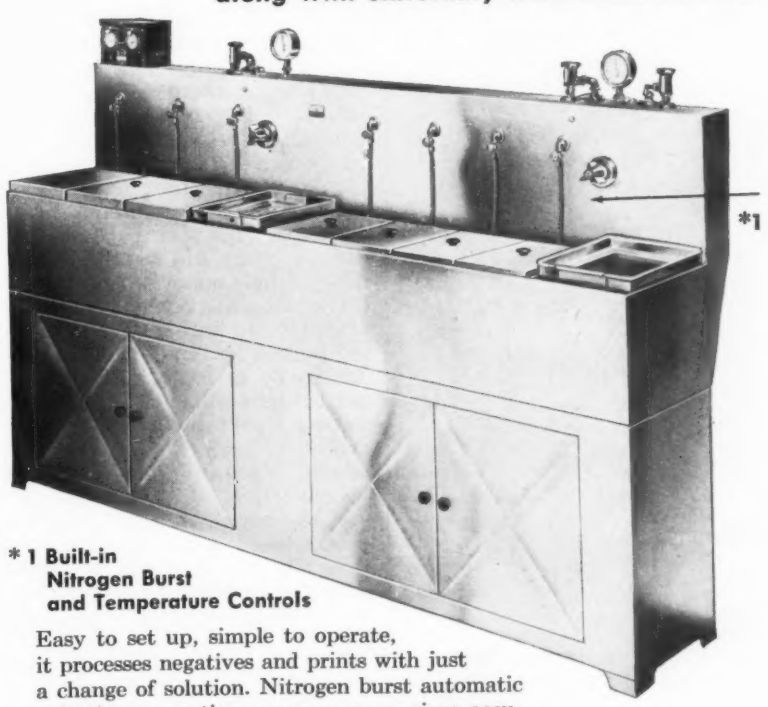

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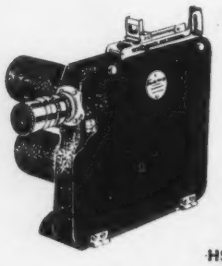

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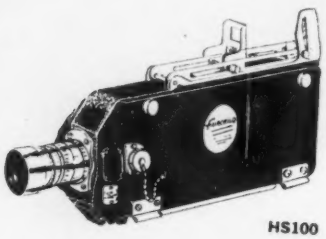

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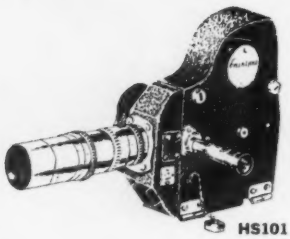

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by Lloyd E. Varden

PHOTO METHODS FOR TOMORROW

Photo-copying practices and the copyright laws—a short review

I am not versed in the complexities of established laws or the interpretation of isolated court decisions, but at times I wish I did know a little bit more about these subjects than I do. If I did I would begin to drop properly phrased arguments in the laps of those responsible for making the laws concerning the limited photo-copying of copyrighted material, with the view of getting some changes made. Some of the existing regulations, assuming that they are being correctly interpreted by the companies engaged in commercial photo-copying, are insidious and, to me, painfully annoying.

On more than one occasion I have attempted to have a page of a book or journal photo-copied in New York, only to be told that it could not be done without a letter of permission from the publisher. Very recently I needed photo-copies of several pages from two books published before 1900 to include in a special report. Three photo-copy firms refused, and none would budge even after I explained that the books had been out of print for years and the publishers no longer existed. I was left with the only alternative of having the pages typed and tracing four line drawings by hand. I certainly did not consider the cutting of the pages from the books as a sensible alternative.

Now I don't get it. Whenever time permits I can order photo-copies of selected pages from almost any book or journal from a number of different technical libraries, including some of the government libraries in Washington. (But all too often these libraries do not have particular books that are contained in my own private collection.) Why the commercial photo-copy houses are so reluctant to touch an order involving a copyrighted publication is difficult to fathom. I guess I'm supposed to install a Photostat or Rectigraph machine to meet my occasional needs, but even with such equipment at my disposal I would be breaking the law apparently to photo-copy anything of recent vintage having a copyright notice.

Having developed, as a result of such frustrating experiences, a yen to learn some of the facts related to the copyright regulations and photo-copying I called a couple of lawyer friends who said, in effect, "Oh, this is a very complicated situation and depends often upon particular circumstances." I could have had a report prepared on the legal intricacies involved, but at a cost far exceeding that of a photo-copying machine. So instead I looked into some of the recently published literature on the subject.

First of all, I was aghast to find that so much *has* been written about the interpretation of the copyright laws and photo-copying practices. But I would say that the best recent reviews on the subject are the following:

"Photocopying and Copyright: A Progress Report," Robert S. Bray, *Special Libraries*, March, 1957.

"Photocopying and Copyright: A Second Report," Robert S. Bray, *Special Libraries*, November, 1957.

I Never Remember Which: The Copyright Problem," Albert S. Davis, Jr., *Special Libraries*, November, 1957.

It would pay all industrial photographers to read these papers. The authors are in a position to write on the subject with authority. Mr. Bray is one of the division chiefs in the Library of Congress and Chairman of the Photographic Reproduction Committee of the Special Libraries Association. Mr. Davis is the resident attorney for a research organization in New York City. They have completely different approaches to the subject, but both are highly informa-

tive in their respective ways.

Mr. Davis quotes the following from a textbook on the laws pertaining to copyrights, which seems to be fundamental as far as defining the legal offense involved in photo-copying a copyrighted item and the extent of punishment in case of conviction:

"WILFUL INFRINGEMENT FOR PROFIT. Any person who wilfully and for profit shall infringe any copyright secured by this title, or who shall knowingly and wilfully aid or abet such infringement, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by imprisonment for not exceeding one year or by fine of not less than $100 nor more than $1,000, or both, in the discretion of the court: *Provided, however*, that nothing . . ."

But when profit has not been gained and when the photo-copy has been made for scholarly purposes there are certain assumed legal provisions for "fair use" or "intellectual use" of copyrighted material. A library, for example, never objects to longhand copying of data from publications, but if the library furnishes photo-copies of what a student requires, fine points of the law arise which endanger the legal position of the library. Maybe the library makes a profit on their photo-reproduction services. Possibly facsimile copies will be produced and sold by the recipient of the reproduction, making the library a party to an infringement offense. Such possibilities are sidetracked by some libraries by requiring the photo-copy purchaser to sign a printed form absolving them of all legal responsibility. Whether this has any legal justification or would hold up in court is questionable. A restaurant that does not provide a hat check room must pay the cost for stolen garments of guests despite posted signs reading, "not responsible for lost articles."

Even the expression "fair use" is legally undefined because there has never been a pointed legal case, civil or criminal, establishing its meaning by court precedent.

Mr. Davis has set forth the following suggested rules for a library reproduction department which are fearful enough to fully explain why I have difficulty in obtaining photo-copies from commercial firms:

1.) You have no *right* to furnish *any* copy of *any* copyrighted work, in whole or in part. People will usually let you do so, as a *privilege*, if you don't abuse the privilege.

2.) It is abusing the privilege to:

(a) Furnish a complete copy of

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a volume or of a magazine number;

(b) Furnish any copy unless you reproduce the copyright notice.

(c) Furnish any copy to any person who is using it for a purpose other than study;

(d) Furnish more than one copy to any person, or more than a few, say five, copies to everyone;

(e) Furnish any copies where the publication is readily available from trade sources;

(f) Furnish copies at less than the trade price of the publication; at least where it is at all available from trade sources.

3.) Make every customer sign a statement reading as follows:

> This material is required and will only be used for study and research purposes; no other use and no reproduction of it will be made. The purchaser agrees to defend, idemnify and hold harmless the Institute from and against all claims, suits, damages, costs and expenses based on any charge of statutory or common-law infringement flowing from the Institute's supplying this material, or any use made of it.
>
> Name .....
> by .....
> (authorized signature)

4.) If you're a commercial library, don't do it at all. If you're a library in a commercial firm, don't do it at all for anyone except your firm's own staff, and then only for study by the staff itself.

Mr. Bray and his special committee, although obviously sympathetic toward the poor bloke who is constantly restricted in scholarly pursuits by the ill-defined and short-sighted legalities of photo-copy regulations, have no better solutions to the over-all problem. Their latest recommendations to libraries are,

1.) Advise the applicant, or require him to sign a statement, as to restrictions on use of the copy.

2.) Secure some assurance that the applicant assumes responsibility for any claims arising out of the making or use of the photo-copy.

3.) Superimpose a statement of the source of the article and the conditions surrounding its use on the original before copying.

Since these recommendations are not acceptable to commercial photo-copying firms—they apparently refuse to take any legal risks—the only hope we have for an easing of the situation outside of the library field is for a legal case in point to arise, presided over by a judge who has been perplexed himself by the difficulties in obtaining a simple thing like a photo-copy.—THE END

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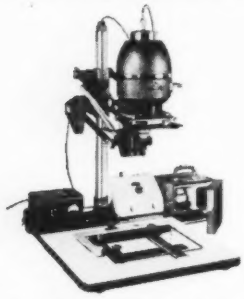

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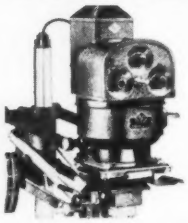

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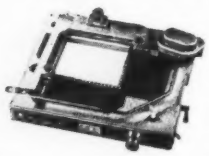

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by Samuel Lang & Leonard Zoref

INDUSTRIAL COLOR

Super Anscochrome, Tungsten Type fastest and handiest color film

In Super Anscochrome Tungsten the photographer has an extremely versatile, almost universal, color transparency film. It is balanced for 3200K and it renders colors accurately—at an exposure index of 100 or even better than that.

Even in the face of color temperature ranges from 3100 to 3350K it has produced good results. Color latitude is nice to have, but it's no cause for throwing caution to the winds. The correct filter should be used when you know the color temperature of the light doesn't match the color balance of the film. There are times however when you do not have the right filter with you and you must rely on the film to take up the slack. Super Anscochrome Tungsten does it very well.

Fine for daylight, aerials

Surprisingly, this film really comes into its glory with daylight. With a Wratten 85B conversion filter the exposure index is reduced by only 20 per cent to a still healthy 80 and color rendition is excellent. The 85B filter, by the way, cuts haze effectively. We highly recommend the combination of Super Anscochrome Tungsten and 85B filter for aerial shots or distant scenes.

When shooting in open shade add an 81 filter to the 85B. This counteracts the shift you are otherwise apt to get under such conditions. If obtainable, a Wratten 83 or an Ansco 11 filter will do the job alone for shooting under this bluish light. Exposure index is 80 in either case.

Fluorescent illumination

Filter information for fluorescent shooting is more tentative. We are indebted to Norman Rothschild for the following data, which he says have worked out for him. He warns that they should be the basis for your own tests only. Ansco has not as yet published recommendations.

a) Daylight fluorescents. Use a Wratten 85 filter with an e.i. of 80.

b) Cool White fluorescents. Use a Wratten 85C filter and an e.i. of 80.

c) Warm White fluorescents. Use and 81A to an 81C filter and an exposure index of 80.

Under certain mixed light conditions the choice of filter and film may be perplexing. With Super Anscochrome Tungsten you can filter for daylight illumination or what have you—or shoot for tungsten illumination on the same roll—and decide after processing which suits your personal preference.

Souped-up development

Super Anscochrome Tungsten's exposure index under tungsten light is 100, and the grain is quite fine for a film as fast as this. The film can be overdeveloped to compensate for underexposure at an e. i. of 200 without great sacrifice of color balance. We have even pushed the Super Anscochrome Tungsten to 400 but at this speed there is a sacrifice of maximum density. The blacks become a bit too weak and there are noticeable losses in color saturation.

We sometimes wonder why photographers want the film pushed to 400. One photographer insisted he could not photograph a situation unless he had that speed. At our suggestion he shot an extra roll at an exposure index of 400, which we developed as if it were shot at an e.i. of 150. Although the transparencies from the test roll were darker than normal, they still were quite acceptable. The most striking difference was that the color of the transparencies in the test roll was well-saturated and brilliant compared to the pale colors in the other rolls.

Increasing the film speed consists of prolonging the duration of both first and the color development. Ansco's normal recommendations are 16 min. in the first and 14 in the color developer.

When assigning an e.i. of 150 to the film, Ansco recommends 19 min. in the first developer and 16 in the color developer. For an e.i. of 200 develop 23 min. in the first developer and 16 in the color developer.

If you must use indexes of 300 to 400, develop your materials for 30 min. in the first developer and then 24 min. in the color developer.

Cool storage

Recently it has been brought to our attention that some of the newer high speed color films seem to deteriorate sooner than the expiration date. The blacks take on a greenish cast. Deterioration is almost completely arrested if the film is stored under refrigeration or even in a deep freeze. When film is taken out of refrigeration it should be allowed to warm up for about 2 hours. Allow about 4 hours for film kept in a deep freeze. Unused film can be put back without harm as long as inner wrapping has not been opened. If the foil wrap has been unsealed, condensation can form easily on the film and create difficult problems.

We have been using an emulsion that is outdated 7 months. and we find it is as good as the day it was released by the manufacturer because it has been kept cool. Some large users may order as many as 10,000 sheets of film of one particular emulsion to last them several months. They have to have the first sheet match the last sheet, and the only way this can be accomplished is by proper film storage, under the necessary refrigeration.

Unless you're sure the film has been stored in a cold place till the time you buy it, make sure it's dated 12 to 15 months ahead.

Kodacolor transparencies

The Eastman Kodak Co. has announced that it will make Kodacolor transparencies from 35mm or 828 Kodacolor negatives. The price is 20¢ per slide. Kodak makes the slides on a new type of Kodacolor print film which will be made available to the public later this year. The new Kodacolor print film is designed to be processed in the C-22 Kodacolor Kit solutions. Kodacolor transparencies seem to be the answer when quantities of identical slides are needed. One master negative produces as many transparencies as you wish without the loss in quality you may have experienced in other inexpensive methods of duplication. We will be reporting more about this when the Kodacolor print film is released. —THE END

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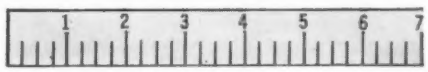

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by Edward R. Farber

ELECTRONIC FLASH

New ideas in flash from Professional Photographers Convention.

When EK's Lynn Brown posed the question "Industrial Photography, in Fashion or in Trouble?" during his keynote speech to the Industrial Group at the recent Professional Photographers Convention in Chicago, registration of some 500 provided proof of being "in fashion."

Continued attendance at the sessions gave evidence of troubles, but most left with practical solutions.

Electronic flash was not a formal part of the Industrial program, so we have no great news to report, but enough new ideas were shown at the manufacturers exhibit to warrant our waiting a month to find out "How Much Do Flash Units Really Save?"

HICO-LITE introduced a unique electronically regulated unit. It's a 300 WS power supply which will hold exposure variations within ½ of 1 per cent, yet weighs only 15 lbs. Recycle time is remarkably short, seven seconds for 300 WS and 10 seconds for 900 WS. This short charging time is accomplished by having a power supply capable of going to much higher voltages and cutting it off when the voltage on the capacitors reaches a precise predetermined point. Safety features include a disconnect which will operate upon failure of a capacitor or shorting of a component and which sounds a buzzer to give immediate audible warning to the operator. Power cannot be restored until the defect is corrected.

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The two power cords to the lamp heads *each* split in a "Y" connection to provide 90 and 60 watt-seconds respectively. This outfit should be ideal for "ID" photos in color or for medical or scientific uses where unskilled operators are required to produce precise color exposures day after day.

PHOTOGENIC'S "Tripmaster" is an ingenious remote triggering arrangement which eliminates the need of connecting cords or phototubes in AC operated units. A small (cigarette pack size) "transmitter" on the camera sends a high frequency pulse through the AC line which is picked up by a receiver about the size of a 35mm, 36 exposure film box. The receiver plugs into the phototube socket of the power pack. It works only with the Photogenic equipment, of course. Adapter kits are required to use it with earlier models.

"Giraffe" revived

Photogenic has also revived in principle the "Giraffe Boom," the boom spot with the single handle control devised by Edison Price. The "Boomaster" boom spot is ruggedly built and the control works very smoothly indeed. Adapts to present Photogenic spots also.

SPEEDOTRON'S Don Communale (who recently moved his company into new, larger and very modern quarters) was busy demonstrating a continuous light unit for photomicrography viewing or focussing. It's unique in providing the continuous flash power only. The same flashtube is simultaneously connected to a regular full size pack which provides the exposing flash. There is no delay between the viewing flash and exposing flash.

SPEEDOTRON is now using the new silicon rectifiers which, while only an inch long and a quarter inch in diameter, are capable of carrying high voltage charging currents of .4 of an ampere. This permits very rapid recycling of even large power supplies without excessive size or weight problems.

SPEEDLIGHT CENTER has a "Solenoid Activator" which enables their tubular type gun and lamp head to be removed from the camera and the shutter tripped from the gun. When used on a Speed Graphic this makes a very compact well balanced arrangement.

BEATTIE-COLEMAN is showing a new line of speedlights which are designed as companion pieces to their new "Portronic" camera.

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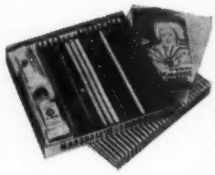

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These are clever unit packages. Only the capacitors are mounted with the reflector. The compact 4 x 3 x 6-in. power supply clips on the stand at about waist height, and is made to handle one or two lights. The dual units can be located at the camera—clipped on the tripod leg for example. On this box is a switch that reverses the relative intensity of the two lamps plugged into it.

For example:

If we had a subject with a 100 WS fill and 200 WS main light, we could reverse their intensity from camera position. Though the models on display did not change the modeling light intensity, future models will include such a feature.

VOSS PHOTO PRODUCTS had a non-electronic gadget which should make life easier for trip cords. It's a molded rubber wire reel. The open ends are surrounded by rubber fingers stiff enough to hold the wire on the reel, but flexible enough to permit pulling the wire out as needed. A 4-in. diameter reel will hold 10 ft. of Zip Cord. They also had a universal trip cord kit with adapters for almost every type of shutter. Could save time, money and vexation in almost any photo department.

OPTICS MANUFACTURING of Philadelphia is offering a line of plastic lenses which may help to solve specialized lighting problems. These lenses are light in weight, low in cost and easy to machine or mount. If you write to their Industrial Division, they will help you with your problems without obligation.

ASCOR showed its new Pulsed arc known as the "Ascorlux." It's basically a form of continuous illumination designed for use by the graphic arts industry where high intensity in the blue and ultraviolet are especially desirable.

Though its 120 pps appear as a continuous light when falling on slowly moving objects, they could very nicely indicate the velocity and direction of rapidly moving objects with a sort of dotted line path.

Well, things are looking up. Our American ingenuity is once more in evidence, but we will look forward to what the Photokina turns up. It's bound to be big news! —THE END

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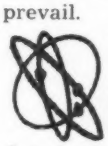

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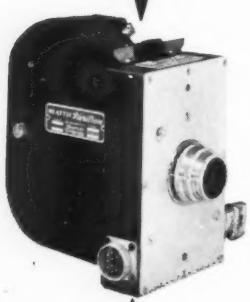

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by Ernest E. Reshovsky

PHOTO INSTRUMENTATION

New equipment for photographing at intervals and around corners

We are all familiar with the effect seen in Western movies, when the spokes of wagon wheels suddenly appear to rotate in the opposite direction from the wagon's travel. This optical phenomenon is of course due to the wheel's rotating at less than an exact multiple of the camera's frames-per-second rate.

We have just heard of an interesting way this phenomenon is being used to study the effects of vibration.

A repetitive electronic flash-tube and a motion picture pulse camera are connected to a vibration console and are operated on the same sine wave as the vibration table. The sine wave frequency is then fed into a device called Slip-Sync which acts as the brain, so to speak, of the system.

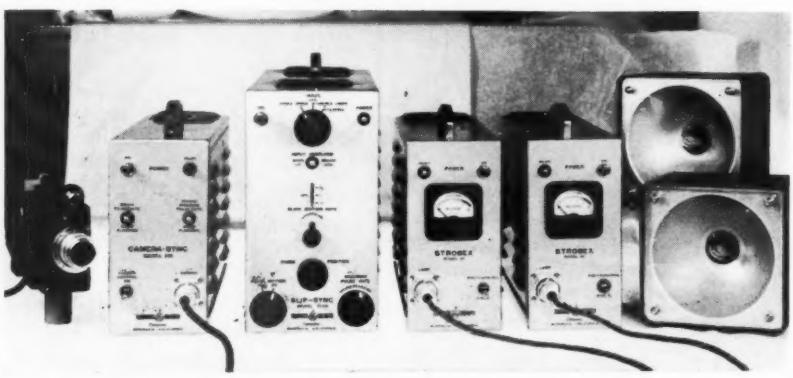
The function of the Slip-Sync is to delay the pulse by a pre-determined amount of time. The delay setting is adjustable from 1/3 to 3 vibration cycles. The number of pulses thus obtained is automatically divided by a count down factor (K), which is a submultiple of the vibration factor. The feature allows the recording pulse camera to operate at a relatively slow speed: as soon as the vibration rate reaches the pre-determined speed of the camera the count-down factor (K) operated through the Slip-Sync lowers the camera and flash rate. When the vibration rate, as speed is increased, again reaches what is now a multiple of the camera speed, the factor again makes its automatic dropdown adjustment and so on to any vibration speed needed for the test purpose.

By the use of this method the camera and flash tubes can operate at comfortable speeds of 1-20 fps, with the obvious advantages of such slow operation, i.e. slow film consumption, regular magazine-loaded film, etc.

The slow motion effect obtained by projecting the film through a standard projector is essentially constant in nature due to the pulsing of the whole Camera-Sync system through the sine-wave generating vibration console.

The recording camera—a 16mm magazine load camera, supplied by Urban Engineering—is without a

THESE UNITS MAKE UP THE SLIP-SYNC SYSTEM



Supplied by the Chadwick Helmuth Company, of Monrovia, Calif., this is the equipment for vibration analysis by Slip-Sync. From left to right: camera, Camera Sync, Slip-Sync, two Strobex units, and two lamps that go with them.

shutter, exposures being effected by the pulsed electronic flash tubes of the Camera-Sync system. The camera itself operates at any pulsing speed from 1-20 fps, has a continuous-running motor and a solenoid-actuated clutch, which engages the film transport upon receipt of the pulsing signal.

An interesting feature of the electronic flash tubes used in the system is fan operated cooling, the fans operating at a rate proportional to the actual flash rate. This allows the flash tubes to operate at a constantly controlled temperature.

Latest twister

Wollensak Optical Co. has just released details on a new lens which handsomely shoots around corners, up or down, backwards and in just about any direction it is set for.

The 22mm f/3.5 Periscope Lens was designed by Wollensak at the request of the Lockheed Aircraft Corp., and will in many applications replace photographing through mirrors, such as in studies of the outside of extremely fast moving vehicles: supersonic sleds, aircraft and missiles under test.

Mounting of recording cameras on the outside of such vehicles has proved to be practically impossible without interfering with the aerodynamic characteristics of the vehicle, not to speak of the mechanical difficulties of mounting a motion picture camera on the skin of a vehicle operating at supersonic speeds. To overcome these handicaps, recording cameras are mounted within the vehicle and pictures shot through a carefully adjusted mirror system.

The Periscope Lens incorporates two prisms adjustable by rotation around the lens axis, and allowing the lens to "see" in any direction. The second prism can be removed in case only 90° deflection is needed. Should it be found necessary to shoot straight ahead at very high speeds, a cover glass is placed over the front prism, to protect it.—THE END

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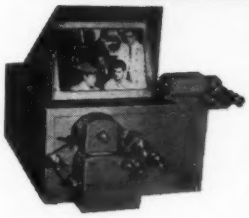

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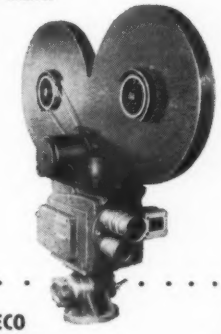

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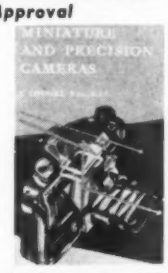

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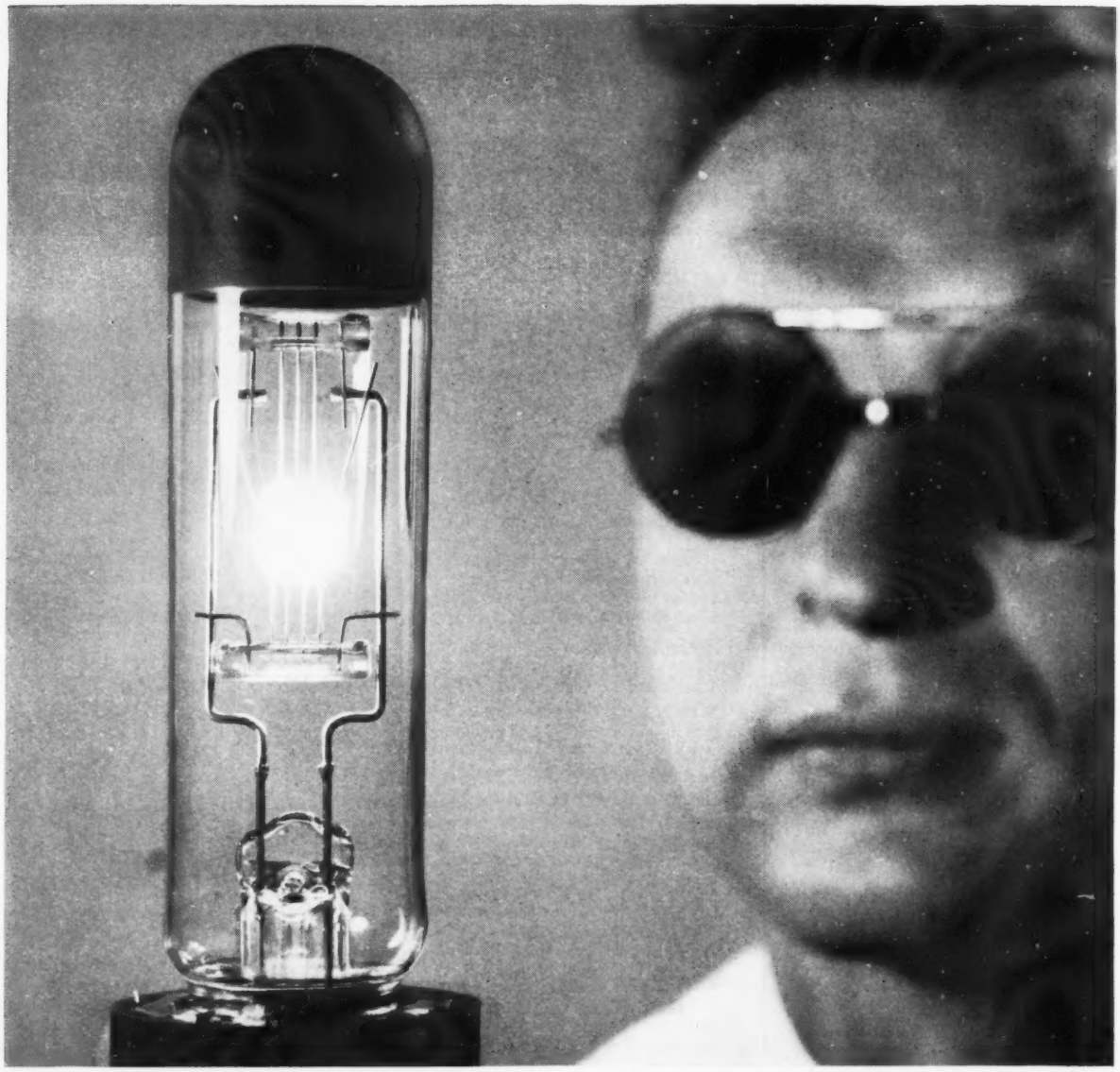

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There's a good reason for this thoroughness. A projection lamp is a precision instrument, requiring the same care in manufacturing as any close-tolerance product, so General Electric "fussbudgets" give their job that extra measure of thoroughness. The result: a projection lamp with recognized G-E dependability—a lamp that stays brighter longer and guarantees a better picture on your screen.

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Brightness—each glass envelope is optically adjusted to let maximum light through.

Long Life—each tungsten filament must meet the rigid standard of 99.95% purity.

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Safety—every G-E projection lamp has a built-in safety fuse to prevent possible damage to the projector.

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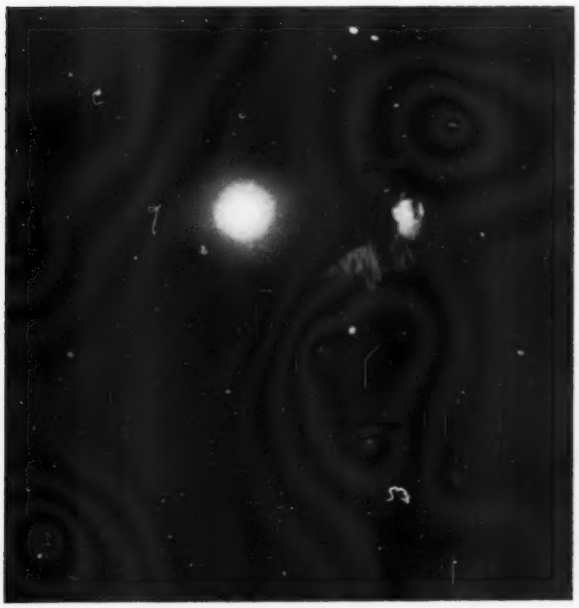
GENERAL ELECTRIC

Get more information. Circle 430, page 59

PHOTOJOURNALISM:
ITS INDUSTRIAL APPLICATION

Morris Gordon

Ex-pug, ex-newspaper photog, and now grand sachem of public relations photography for the vast Western Electric Co., Morris Gordon holds that everyone who uses pictures uses some of the techniques of photojournalism—that is, if they use their pictures right.
The magazine photographer, he feels, can be an expert in limited areas; for there are enough of them to spread the assignments around. The industrial photographer, often working singlehanded, must be versatile enough to manage any of the three types of photo coverage: the unfolding or continuity story; the impressionistic, portfolio, or photo-essay approach; and the re-enactment, "posed-unposed" or "day-in-the-life-of" assignment. Of the three, the last requires most skill, for the photographer must suggest, not pose, the action.



Magazine pictures or industrials? Both. For Western Electric's magazine, WE, Gordon covered what was supposed to be a day in the life of one of the company's interstate truck drivers. Hitch came when heavy snows delayed the trip, so that instead of 18 hours it took 72. In that time, Gordon's driver complained, he hadn't seen Gordon take a single picture. Actually Gordon made almost 300 with 35mm. Driver missed flashbulbs, bulky equipment.

The photojournalist lives in a world of ideas, and it is his job to convert these ideas into pictures. For the working photographer, the end is the published picture.

Though both make use of exactly the same techniques, the magazine photographer has the whole world for his subject; the industrial man, particularly the in-plant staffer, must find his subjects in the company that pays his wages, or among its plants, products, personnel, or customers. The roving photojournalist has always before him the chance for one of those lucky shots Gordon describes pungently as "f/11 and be there" while the in-plant photographer must get along as best he can without such picture-generating circumstances as wars, major accidents, or huge expense accounts. His scope is more restricted.

In spite of the restrictions, though, the industrial photographer has exactly as much opportunity to make good pictures as his more dashing colleague. The difference is not altogether in the assignment; it lies mainly in what the individual photographer finds to say about the subject before his lens. When the shutter clicks he either makes a picture or a snapshot. It's up to him.

Photojournalism is tricky; it's no slur on its stature as an art to consider it a knack. Without a real familiarity with the structure of the picture story, the photographer is shooting in the dark. The best way to learn the technique is to study the picture magazines; those of some twenty years ago, before photojournalism got slick and dazzling, show the story's form better. The industrial man should consider himself—as Gordon does—an editorial photographer working for industry. That is a basic step; it helps change the approach from picture-taking to picture-story making. And with experience the process of telling a story in pictures will become so automatic that on returning to the office with a complete story, the photographer will pick up a single picture in the layout and, puzzled, ask himself: "When the devil did I make that one?"

Equipment? Simply the right camera for the needed picture. Some can only be made with 35mm; others require 4 × 5, and still others call for a view camera's swings and tilts. Don't be afraid to mix cameras. Though the story is a unit, the individual pictures all pose individual problems. They must be treated as individuals.

The industrial photographer—or the editorial photographer working for industry—has to recognize that every activity in the operation he is assigned to cover must be examined for picture possibilities. Chosen from a large assortment of prints, these show the variety Gordon brought back from a single job. The full pager of the truck itself on a lonely stretch of road sets the mood of the story; the telephone lineman, shot from the cab of the truck, is a nod in the direction of Western Electric's best customers—the phone companies. Intimate shots of the employees at work enrich the human interest of the story, while the long shot of the factory—the truck's destination—rounds it out.

PHOTO FIXING: SCIENCE & PRACTICE

The chemicals used for after-treatment of photographs haven't changed substantially since the 19th century. But modern technology reveals a way of using them that's an eye-opener. Here it is. By Eugene Ostroff.

For professional photography, the classic rinse, fixand wash treatment is woefully outdated.

Recent technology points to a new post-development system that is superior in every way to the old one. It unquestionably cuts solution costs by one half or more, reduces the total time of the operation by as much as one third and conserves wash water by giving as permanent an image with five minutes' wash as the old system did with an hour's. It enlarges the working capacity of equipment while utilizing the same chemicals as the old system. And it is reliable; chemically speaking, it results in a high quality print or negative.

Perhaps "old" system is a bit of a strong way to say it. This article recommends a system which *is* the old system with a few alterations, mostly procedural. It also calls for a weak solution of sodium sulfite. All the ideas have appeared in one place or another in the technical or photographic press during the past few years and some of them are even in widespread use. They are, however, presented here in their entirety.

Post-development treatment of prints and negatives is a chain that can be made quite ineffective by the weakening of any link. For this reason, what follows is a discussion of the fundamentals of rinse, fix and wash, with the scientific information organized into a practical working system. It ends with a set of do-it-yourself tests to use occasionally in order to detect unseen faults and make certain the quality of the end product remains high.

Technically speaking after film or paper is developed those silver halides which have not been affected by light remain in the emulsion, unchanged by the developer.

At this point the emulsion contains the image, water-insoluble metal (silver), and undeveloped (milky appearing) silver halide grains. Without disturbing the emulsion these remaining silver halide grains must be removed. Briefly, this is the basic problem in post-development treatment.

The simplest way to get rid of silver halide grains is to make them soluble and wash them away. To do an expert job of it, however, you must be familiar with many more aspects of the problem, not the least of which is the acidity of after-treatment solutions.

ACIDITY

When the photographic image is sufficiently dense, its development must be stopped by a safe, even-working, rapid method. If not, stains, streaks and fog could result. An acid rinse used after development will help prevent these defects from occurring, while paying for itself in fixer conservation.

Developers, in most cases, depend on an alkalinity for their action. If we neutralize the alkali with mild acid solution, development stops. It is important to note however that development continues until *each level* of the emulsion thickness is reached by the acid solution. As the acid works its way into the depths of the emulsion, it in turn is neutralized by developer alkali. Agitation provides uniform and rapid replacement of this exhausted acid.

Loss of acid hardener fixer acidity means loss of its hardening action—which brings about an increased chance of emulsion reticulation and frilling. This is especially true with ammonium thiosulfate (rapid) fixers. An acid rinse makes it easy to maintain fixer acidity because it neutralizes developer alkali, which therefore never has a chance to reach the hypo. When strong alkali (caustic) developers are used, a smaller carry-over volume will have a greater effect than with less active developers. Variations in type and thickness of both the emulsion and its support also alter these effects.

Failure to properly neutralize developer activity and prevent carry-over to the fixer could result in a number of processing defects. For example, brownish-yellow stains from developer oxidation can occur—either because the material is not completely immersed in fixer, allowing the developing agent to react with oxygen in the air—or because the fixer is weak. Aluminum precipitates or calcium sulfite may form whitish stains. Uneven continuation of development may streak the image. Dichroic fog—greenish-yellow when viewed by reflected light, and pink or purple viewed by transmitted light—has a more complex origin. Weakened

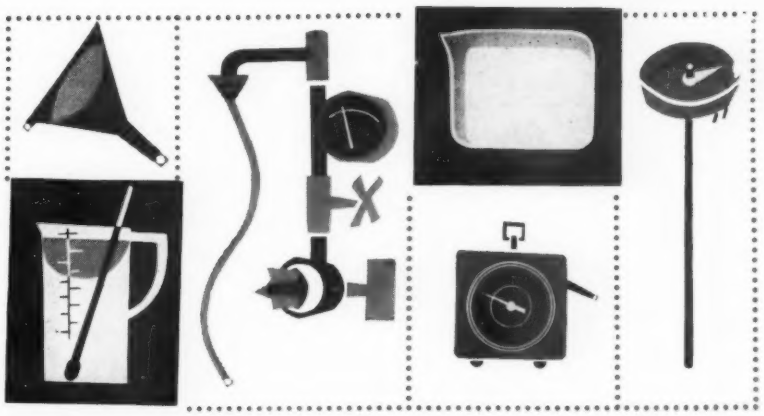
fixer slowly starts dissolving the undeveloped silver halide but the still-active developer remaining in the emulsion acts on the silver halide and redeposits metallic silver. With ammonium thiosulfate fixers, fog can be formed upon the liberation of ammonia by developer alkali carry-over. With these fixers, agitation is especially important.

From what has been pointed out we can see that acidity and alkalinity are important factors in the efficiency of post-development processing. For scientific convenience the symbol pH is used to denote the degree of acidity or alkalinity. A pH of 7.0 indicates neutrality. All values below 7.0 indicate the degree of acidity and those values above 7.0, the degree of alkalinity. The values increase in geometric ratio, that is, a solution with pH 4.0 is 10 times more acid than one with pH 5.0 and 100 times more acid than a solution with pH 6.0.

Maintain a close check on stop bath acidity (pH) to avoid the pitfalls mentioned above. Short-range indicator papers are a simple and inexpensive means for checking pH. These chemically impregnated papers are merely wetted with solution and the resultant color matched with a set of calibrated comparison colors printed on the container. No more than a one inch strip is needed at a time and the cost is less than one cent per test. Four sources of supply for these indicator papers are: Micro Essential Lab, 4224 Ave. H, Brooklyn, N.Y.; Arthur H. Thomas & Co., Philadelphia, Pa.; Scientific Supply, Bloomfield, N.J. and Fisher Scientific Co., 633 Greenwich St., New York, N.Y. Specify those with a pH range of 3.5 to 5.5 if you order. Other ranges are useless.

STOP BATH

The stop bath should be held within a pH range of 3.5 to 5.5. If the bath is mixed too strong (too acid, with pH lower than 3.5) it could: (1) react with developers containing sodium carbonate to form carbon dioxide too rapidly in the emulsion and cause blisters; (2) make washing more difficult because destructive residual chemicals are more strongly retained; (3) cause the base to become overly brittle; (4) cause generation of sulfur dioxide gas (rotten egg



PMI's FIX & WASH QUALITY CHECK

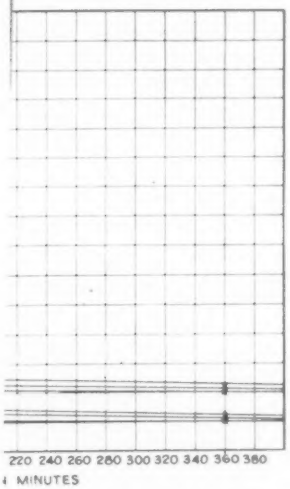
ciency.

To remove unwanted salts from he emulsion itself is a relatively imple procedure because the gela-in yields these without much diffi-ulty. Nor does film base tend to etain unwanted complexes. Paper ase and baryta coating however etain these complexes with re-markable tenacity. *This difficulty ncreases with overlong immersion in either the acid rinse or acid*

physical damage during wash, drying and subsequent handling, it is advisable to restrict water temperature to between 65 and 75°F.

WASH ACCELERATORS

It has been found that wash times can be greatly shortened, and removal of large quantities of unwanted salts facilitated, by the use of sodium sulfite as a wash accelerator. Used (*cont. on page* 55)



water affects the washing time
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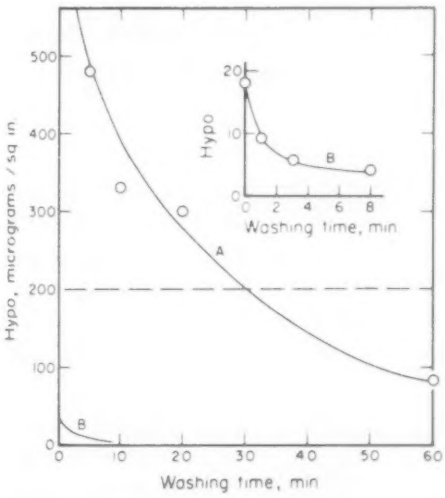

Fig. 4 Washing-time vs. hypo concentration for photo materials with usual processing (A) and with post-hypo bath in sodium sulfite solution (B); inset is enlarged version of B. From *Photographic Engineering*, V. 7.

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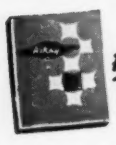

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Get more information. Circle 407, page 59

by Edward R. Farber

ELECTRONIC FLASH

New ideas in flash from Professional Photographers Convention.

When EK's Lynn Brown posed the question "Industrial Photography, in Fashion or in Trouble?" during his keynote speech to the Industrial Group at the recent Professional Photographers Convention in Chicago, registration of some 500 provided proof of being "in fashion."

Continued attendance at the sessions gave evidence of troubles, but most left with practical solutions.

Electronic flash was not a formal part of the Industrial program, so we have no great news to report, but enough new ideas were shown at the manufacturers exhibit to warrant our waiting a month to find out "How Much Do Flash Units Really Save?"

HICO-LITE introduced a unique electronically regulated unit. It's a 300 WS power supply which will hold exposure variations within ½ of 1 per cent, yet weighs only 15 lbs. Recycle time is remarkably short, seven seconds for 300 WS and 10 seconds for 900 WS. This short charging time is accomplished by having a power supply capable of going to much higher voltages and cutting it off when the voltage on the capacitors reaches a precise predetermined point. Safety features include a disconnect which will operate upon failure of a capacitor or shorting of a component and which sounds a buzzer to give immediate audible warning to the operator. Power cannot be restored until the defect is corrected.

Ideal for "ID"

The two power cords to the lamp heads *each* split in a "Y" connection to provide 90 and 60 watt-seconds respectively. This outfit should be ideal for "ID" photos in color or for medical or scientific uses where unskilled operators are required to produce precise color exposures day after day.

PHOTOGENIC'S "Tripmaster" is an ingenious remote triggering arrangement which eliminates the need of connecting cords or phototubes in AC operated units. A small (cigarette pack size) "transmitter" on the camera sends a high frequency pulse through the AC line which is picked up by a receiver about the size of a 35mm, 36 exposure film box. The receiver plugs into the phototube socket of the power pack. It works only with the Photogenic equipment, of course. Adapter kits are required to use it with earlier models.

"Giraffe" revived

Photogenic has also revived in principle the "Giraffe Boom," the boom spot with the single handle control devised by Edison Price. The "Boomaster" boom spot is ruggedly built and the control works very smoothly indeed. Adapts to present Photogenic spots also.

SPEEDOTRON'S Don Communale (who recently moved his company into new, larger and very modern quarters) was busy demonstrating a continuous light unit for photomicrography viewing or focussing. It's unique in providing the continuous flash power only. The same flashtube is simultaneously connected to a regular full size pack which provides the exposing flash. There is no delay between the viewing flash and exposing flash.

SPEEDOTRON is now using the new silicon rectifiers which, while only an inch long and a quarter inch in diameter, are capable of carrying high voltage charging currents of .4 of an ampere. This permits very rapid recycling of even large power supplies without excessive size or weight problems.

SPEEDLIGHT CENTER has a "Solenoid Activator" which enables their tubular type gun and lamp head to be removed from the camera and the shutter tripped from the gun. When used on a Speed Graphic this makes a very compact well balanced arrangement.

BEATTIE-COLEMAN is showing a new line of speedlights which are designed as companion pieces to their new "Portronic" camera.

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These are clever unit packages. Only the capacitors are mounted with the reflector. The compact 4 x 3 x 6-in. power supply clips on the stand at about waist height, and is made to handle one or two lights. The dual units can be located at the camera—clipped on the tripod leg for example. On this box is a switch that reverses the relative intensity of the two lamps plugged into it.

For example:

If we had a subject with a 100 WS fill and 200 WS main light, we could reverse their intensity from camera position. Though the models on display did not change the modeling light intensity, future models will include such a feature.

VOSS PHOTO PRODUCTS had a non-electronic gadget which should make life easier for trip cords. It's a molded rubber wire reel. The open ends are surrounded by rubber fingers stiff enough to hold the wire on the reel, but flexible enough to permit pulling the wire out as needed. A 4-in. diameter reel will hold 10 ft. of Zip Cord. They also had a universal trip cord kit with adapters for almost every type of shutter. Could save time, money and vexation in almost any photo department.

OPTICS MANUFACTURING of Philadelphia is offering a line of plastic lenses which may help to solve specialized lighting problems. These lenses are light in weight, low in cost and easy to machine or mount. If you write to their Industrial Division, they will help you with your problems without obligation.

ASCOR showed its new Pulsed arc known as the "Ascorlux." It's basically a form of continuous illumination designed for use by the graphic arts industry where high intensity in the blue and ultraviolet are especially desirable.

Though its 120 pps appear as a continuous light when falling on slowly moving objects, they could very nicely indicate the velocity and direction of rapidly moving objects with a sort of dotted line path.

Well, things are looking up. Our American ingenuity is once more in evidence, but we will look forward to what the Photokina turns up. It's bound to be big news! —THE END

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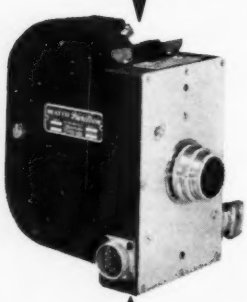

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by Ernest E. Reshovsky

PHOTO INSTRUMENTATION

New equipment for photographing at intervals and around corners

We are all familiar with the effect seen in Western movies, when the spokes of wagon wheels suddenly appear to rotate in the opposite direction from the wagon's travel. This optical phenomenon is of course due to the wheel's rotating at less than an exact multiple of the camera's frames-per-second rate.

We have just heard of an interesting way this phenomenon is being used to study the effects of vibration.

A repetitive electronic flash-tube and a motion picture pulse camera are connected to a vibration console and are operated on the same sine wave as the vibration table. The sine wave frequency is then fed into a device called Slip-Sync which acts as the brain, so to speak, of the system.

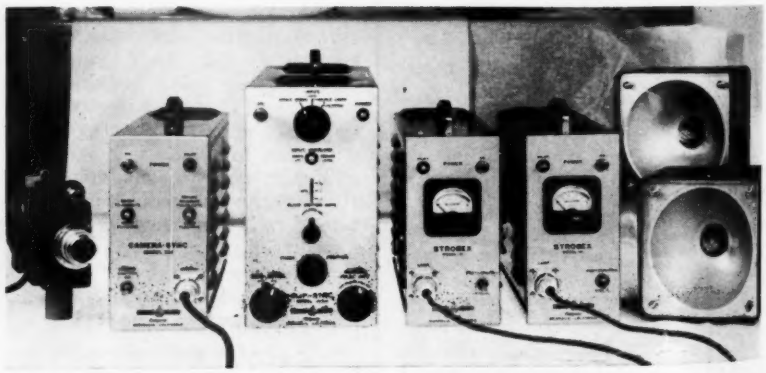
The function of the Slip-Sync is to delay the pulse by a pre-determined amount of time. The delay setting is adjustable from 1/3 to 3 vibration cycles. The number of pulses thus obtained is automatically divided by a count down factor (K), which is a submultiple of the vibration factor. The feature allows the recording pulse camera to operate at a relatively slow speed: as soon as the vibration rate reaches the pre-determined speed of the camera the count-down factor (K) operated through the Slip-Sync lowers the camera and flash rate. When the vibration rate, as speed is increased, again reaches what is now a multiple of the camera speed, the factor again makes its automatic dropdown adjustment and so on to any vibration speed needed for the test purpose.

By the use of this method the camera and flash tubes can operate at comfortable speeds of 1-20 fps, with the obvious advantages of such slow operation, i.e. slow film consumption, regular magazine-loaded film, etc.

The slow motion effect obtained by projecting the film through a standard projector is essentially constant in nature due to the pulsing of the whole Camera-Sync system through the sine-wave generating vibration console.

The recording camera—a 16mm magazine load camera, supplied by Urban Engineering—is without a

THESE UNITS MAKE UP THE SLIP-SYNC SYSTEM



Supplied by the Chadwick Helmuth Company, of Monrovia, Calif., this is the equipment for vibration analysis by Slip-Sync. From left to right: camera, Camera Sync, Slip-Sync, two Strobex units, and two lamps that go with them.

shutter, exposures being effected by the pulsed electronic flash tubes of the Camera-Sync system. The camera itself operates at any pulsing speed from 1-20 fps, has a continuous-running motor and a solenoid-actuated clutch, which engages the film transport upon receipt of the pulsing signal.

An interesting feature of the electronic flash tubes used in the system is fan operated cooling, the fans operating at a rate proportional to the actual flash rate. This allows the flash tubes to operate at a constantly controlled temperature.

Latest twister

Wollensak Optical Co. has just released details on a new lens which handsomely shoots around corners, up or down, backwards and in just about any direction it is set for.

The 22mm f/3.5 Periscope Lens was designed by Wollensak at the request of the Lockheed Aircraft Corp., and will in many applications replace photographing through mirrors, such as in studies of the outside of extremely fast moving vehicles: supersonic sleds, aircraft and missiles under test.

Mounting of recording cameras on the outside of such vehicles has proved to be practically impossible without interfering with the aerodynamic characteristics of the vehicle, not to speak of the mechanical difficulties of mounting a motion picture camera on the skin of a vehicle operating at supersonic speeds. To overcome these handicaps, recording cameras are mounted within the vehicle and pictures shot through a carefully adjusted mirror system.

The Periscope Lens incorporates two prisms adjustable by rotation around the lens axis, and allowing the lens to "see" in any direction. The second prism can be removed in case only 90° deflection is needed. Should it be found necessary to shoot straight ahead at very high speeds, a cover glass is placed over the front prism, to protect it.—THE END

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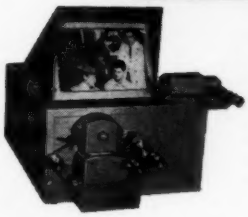

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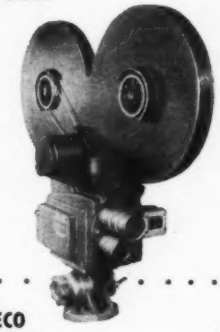

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There's a good reason for this thoroughness. A projection lamp is a precision instrument, requiring the same care in manufacturing as any close-tolerance product, so General Electric "fussbudgets" give their job that extra measure of thoroughness. The result: a projection lamp with recognized G-E dependability—a lamp that stays brighter longer and guarantees a better picture on your screen.

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GENERAL ELECTRIC

Get more information. Circle 430, page 59

AN EDITORIAL

CRAFT AND SELL, HE NEEDS BOTH . . .

MAYBE it's selfish, but if for no other reason than to preserve his income, the photographer in industry has two important jobs to do. One of course is to supply pictures. His other job is to persuade, tutor, cajole, inform and convince the people with whom he works that photography can be of value to them.

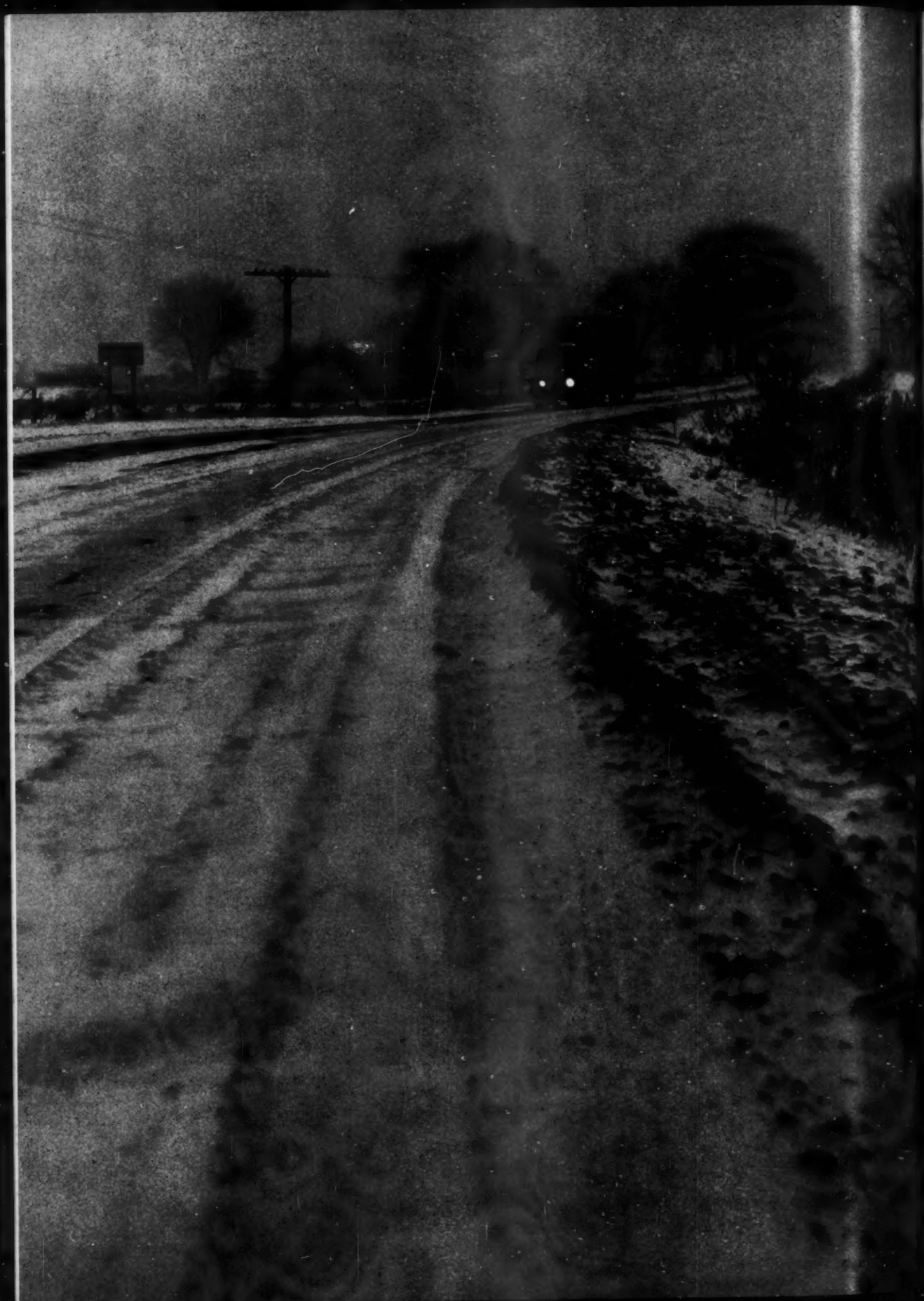
At the first job most full-time staff photographers are whizzes. It's in their own public relations that the in-plant photographer's work is often spotty. There are many symptoms, principal among which is the fact that the overwhelming majority of corporation executives do not have a clear notion of what the photo department does for them, much less what it can do for them.

Too many organizations create waste because they neglect to use photographic tools, or because they fail to take advantage of the photographer's brain in selecting the right photographic tools.

The boss of a thriving and extremely useful photo department puts it this way, "I love photography, but I don't take pictures any more. Running this madhouse takes half my time and during the rest of it I sell." Another photo unit has printed sales promotion for distribution inside the organization by photo department members. Trained technicians are the best people to sell photography and help administrators order photographic work efficiently. Today's photography is too highly developed for the layman to find his way around in it without guidance. One alert photo department did a presentation to top brass showing what they had to offer. At another company, one of a course of lectures for incoming scientists and technicians is on what photo services can do for them.

It's all necessary work. If the photo department doesn't do it for itself, nobody else will do it for them.

The Editors



PHOTOJOURNALISM:
ITS INDUSTRIAL APPLICATION

Morris Gordon

Ex-pug, ex-newspaper photog, and now grand sachem of public relations photography for the vast Western Electric Co., Morris Gordon holds that everyone who uses pictures uses some of the techniques of photojournalism—that is, if they use their pictures right.
The magazine photographer, he feels, can be an expert in limited areas; for there are enough of them to spread the assignments around. The industrial photographer, often working singlehanded, must be versatile enough to manage any of the three types of photo coverage: the unfolding or continuity story; the impressionistic, portfolio, or photo-essay approach; and the re-enactment, "posed-unposed" or "day-in-the-life-of" assignment. Of the three, the last requires most skill, for the photographer must suggest, not pose, the action.

Magazine pictures or industrials? Both. For Western Electric's magazine, WE, Gordon covered what was supposed to be a day in the life of one of the company's interstate truck drivers. Hitch came when heavy snows delayed the trip, so that instead of 18 hours it took 72. In that time, Gordon's driver complained, he hadn't seen Gordon take a single picture. Actually Gordon made almost 300 with 35mm. Driver missed flashbulbs, bulky equipment.

The photojournalist lives in a world of ideas, and it is his job to convert these ideas into pictures. For the working photographer, the end is the published picture.

Though both make use of exactly the same techniques, the magazine photographer has the whole world for his subject; the industrial man, particularly the in-plant staffer, must find his subjects in the company that pays his wages, or among its plants, products, personnel, or customers. The roving photojournalist has always before him the chance for one of those lucky shots Gordon describes pungently as "f/11 and be there" while the in-plant photographer must get along as best he can without such picture-generating circumstances as wars, major accidents, or huge expense accounts. His scope is more restricted.

In spite of the restrictions, though, the industrial photographer has exactly as much opportunity to make good pictures as his more dashing colleague. The difference is not altogether in the assignment; it lies mainly in what the individual photographer finds to say about the subject before his lens. When the shutter clicks he either makes a picture or a snapshot. It's up to him.

Photojournalism is tricky; it's no slur on its stature as an art to consider it a knack. Without a real familiarity with the structure of the picture story, the photographer is shooting in the dark. The best way to learn the technique is to study the picture magazines; those of some twenty years ago, before photojournalism got slick and dazzling, show the story's form better. The industrial man should consider himself—as Gordon does—an editorial photographer working for industry. That is a basic step; it helps change the approach from picture-taking to picture-story making. And with experience the process of telling a story in pictures will become so automatic that on returning to the office with a complete story, the photographer will pick up a single picture in the layout and, puzzled, ask himself: "When the devil did I make that one?"

Equipment? Simply the right camera for the needed picture. Some can only be made with 35mm; others require 4 × 5, and still others call for a view camera's swings and tilts. Don't be afraid to mix cameras. Though the story is a unit, the individual pictures all pose individual problems. They must be treated as individuals.

The industrial photographer—or the editorial photographer working for industry—has to recognize that every activity in the operation he is assigned to cover must be examined for picture possibilities. Chosen from a large assortment of prints, these show the variety Gordon brought back from a single job. The full pager of the truck itself on a lonely stretch of road sets the mood of the story; the telephone lineman, shot from the cab of the truck, is a nod in the direction of Western Electric's best customers—the phone companies. Intimate shots of the employees at work enrich the human interest of the story, while the long shot of the factory—the truck's destination—rounds it out.

PHOTO FIXING: SCIENCE & PRACTICE

The chemicals used for after-treatment of photographs haven't changed substantially since the 19th century. But modern technology reveals a way of using them that's an eye-opener. Here it is. By Eugene Ostroff.

For professional photography, the classic rinse, fixand wash treatment is woefully outdated.

Recent technology points to a new post-development system that is superior in every way to the old one. It unquestionably cuts solution costs by one half or more, reduces the total time of the operation by as much as one third and conserves wash water by giving as permanent an image with five minutes' wash as the old system did with an hour's. It enlarges the working capacity of equipment while utilizing the same chemicals as the old system. And it is reliable; chemically speaking, it results in a high quality print or negative.

Perhaps "old" system is a bit of a strong way to say it. This article recommends a system which *is* the old system with a few alterations, mostly procedural. It also calls for a weak solution of sodium sulfite. All the ideas have appeared in one place or another in the technical or photographic press during the past few years and some of them are even in widespread use. They are, however, presented here in their entirety.

Post-development treatment of prints and negatives is a chain that can be made quite ineffective by the weakening of any link. For this reason, what follows is a discussion of the fundamentals of rinse, fix and wash, with the scientific information organized into a practical working system. It ends with a set of do-it-yourself tests to use occasionally in order to detect unseen faults and make certain the quality of the end product remains high.

Technically speaking after film or paper is developed those silver halides which have not been affected by light remain in the emulsion, unchanged by the developer.

At this point the emulsion contains the image, water-insoluble metal (silver), and undeveloped (milky appearing) silver halide grains. Without disturbing the emulsion these remaining silver halide grains must be removed. Briefly, this is the basic problem in post-development treatment.

The simplest way to get rid of silver halide grains is to make them soluble and wash them away. To do an expert job of it, however, you must be familiar with many more aspects of the problem, not the least of which is the acidity of after-treatment solutions.

ACIDITY

When the photographic image is sufficiently dense, its development must be stopped by a safe, even-working, rapid method. If not, stains, streaks and fog could result. An acid rinse used after development will help prevent these defects from occurring, while paying for itself in fixer conservation.

Developers, in most cases, depend on an alkalinity for their action. If we neutralize the alkali with mild acid solution, development stops. It is important to note however that development continues until *each level* of the emulsion thickness is reached by the acid solution. As the acid works its way into the depths of the emulsion, it in turn is neutralized by developer alkali. Agitation provides uniform and rapid replacement of this exhausted acid.

Loss of acid hardener fixer acidity means loss of its hardening action—which brings about an increased chance of emulsion reticulation and frilling. This is especially true with ammonium thiosulfate (rapid) fixers. An acid rinse makes it easy to maintain fixer acidity because it neutralizes developer alkali, which therefore never has a chance to reach the hypo. When strong alkali (caustic) developers are used, a smaller carry-over volume will have a greater effect than with less active developers. Variations in type and thickness of both the emulsion and its support also alter these effects.

Failure to properly neutralize developer activity and prevent carry-over to the fixer could result in a number of processing defects. For example, brownish-yellow stains from developer oxidation can occur—either because the material is not completely immersed in fixer, allowing the developing agent to react with oxygen in the air—or because the fixer is weak. Aluminum precipitates or calcium sulfite may form whitish stains. Uneven continuation of development may streak the image. Dichroic fog—greenish-yellow when viewed by reflected light, and pink or purple viewed by transmitted light—has a more complex origin. Weakened

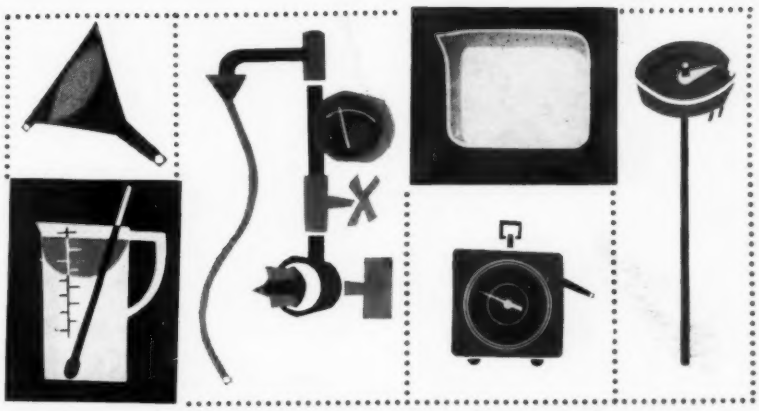
fixer slowly starts dissolving the undeveloped silver halide but the still-active developer remaining in the emulsion acts on the silver halide and redeposits metallic silver. With ammonium thiosulfate fixers, fog can be formed upon the liberation of ammonia by developer alkali carry-over. With these fixers, agitation is especially important.

From what has been pointed out we can see that acidity and alkalinity are important factors in the efficiency of post-development processing. For scientific convenience the symbol pH is used to denote the degree of acidity or alkalinity. A pH of 7.0 indicates neutrality. All values below 7.0 indicate the degree of acidity and those values above 7.0, the degree of alkalinity. The values increase in geometric ratio, that is, a solution with pH 4.0 is 10 times more acid than one with pH 5.0 and 100 times more acid than a solution with pH 6.0.

Maintain a close check on stop bath acidity (pH) to avoid the pitfalls mentioned above. Short-range indicator papers are a simple and inexpensive means for checking pH. These chemically impregnated papers are merely wetted with solution and the resultant color matched with a set of calibrated comparison colors printed on the container. No more than a one inch strip is needed at a time and the cost is less than one cent per test. Four sources of supply for these indicator papers are: Micro Essential Lab, 4224 Ave. H, Brooklyn, N.Y.; Arthur H. Thomas & Co., Philadelphia, Pa.; Scientific Supply, Bloomfield, N.J. and Fisher Scientific Co., 633 Greenwich St., New York, N.Y. Specify those with a pH range of 3.5 to 5.5 if you order. Other ranges are useless.

STOP BATH

The stop bath should be held within a pH range of 3.5 to 5.5. If the bath is mixed too strong (too acid, with pH lower than 3.5) it could: (1) react with developers containing sodium carbonate to form carbon dioxide too rapidly in the emulsion and cause blisters; (2) make washing more difficult because destructive residual chemicals are more strongly retained; (3) cause the base to become overly brittle; (4) cause generation of sulfur dioxide gas (rotten egg



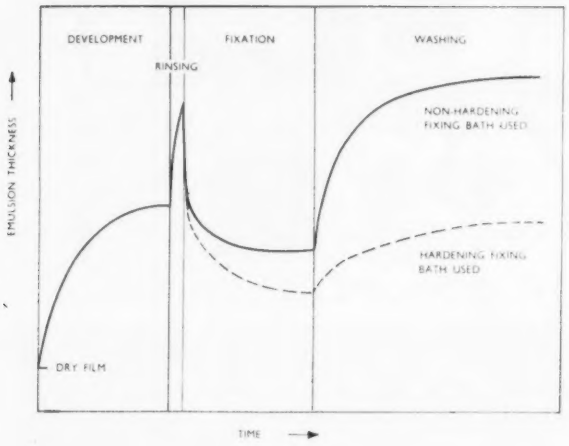
PMI's FIX & WASH QUALITY CHECK

TABLE I

AFTER DEVELOPMENT

1. Acid stop bath; 30-45 seconds (maximum); pH 3.5-5.5
2. Two bath fixer system; 3-5 minutes in each bath (do not exceed maximum). Arrange use in the following way:
   - A) start with 2 one-gallon baths (or the equivalent)
   - B) discard fix #1 after 200 8 x 10 prints
   - C) #2 fix moved to #1 position
   - D) fresh gallon for bath #2, repeat cycle
   - E) discard both solutions after 5th cycle (1000 8 x 10 prints)
3. 1-2 minute rinse in plain water
4. Immersion in 2 per cent sodium solution
   - A) films & single weight prints—minimum 2 minutes
   - B) double weight prints—minimum 3 minutes
5. WASH
   Negatives—five minutes
   Prints, single weight—ten minutes
   Prints, double weight—20 minutes

To mix a 2 per cent sodium sulfite solution
Water—1 gallon
Sodium sulfite (anhydrous)—2½ oz.



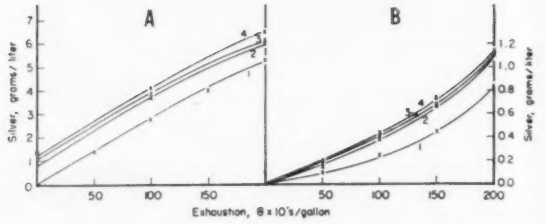


Fig. 2 Silver concentration in hypo through four cycles of the two-bath fix system (*bath I on left, bath II on right*). Reproduced from Crabtree, Henn and Edgerton, PSA *Photographic Science and Technique*, V.19B, No. 1, February, 1953, p. 11, "Two Bath Fixation of Prints."

Fig. 1 The "gymnastics" which the photographic emulsion undergoes during normal processing. Let processing depart from normal too far and it's good-bye emulsion. Less severe mishandling brings less dire but still serious problems. Courtesy *Ilford Manual of Photography*, 1958.

odor) when the sulfite of the developer reaches this bath.

If the pH is permitted to rise above 5.5, indicating exhausted solution, we can have any one or a combination of the difficulties mentioned previously which result from inadequate neutralization of developer alkali. When the stop bath is exhausted, as measured by indicator paper readings, discard it. Very little is gained by replenishment. However, in situations where heavy production schedules would be seriously affected by taking time to mix fresh stop bath, replenishment techniques to offset developer carry-over can be adopted, using a 10 per cent acetic acid solution. Maintain a pH check with indicator papers and discard this bath when a volume of replenisher equal to that of the original stop bath has been added.

FIXER

Hyposulphite of soda has been used as a photographic fixative since 1839. This compound, referred to as "hypo," has since been renamed sodium thiosulfate but the term hypo has stuck. Actually, today's sodium hyposulphite is a different chemical, used mainly in the textile industry.

For normal industrial photographic laboratory requirements, where specialized applications are not involved, a combined acid hardener sodium thiosulfate fix is still an excellent choice. This type of bath will handle considerable material, both negative and print, with minimum attention.

Generally, an acid hardener fix contains: (1) sodium thiosulfate to convert the residual silver halides into a water-soluble complex; (2) a hardener, generally potassium alum to minimize chances of injury to the emulsion during wash, drying and later handling (variations of emulsion swelling during processing can be seen in figure 1); (3) an acid (usually acetic) to achieve optimum results from the hardener and help stop development; (4) sodium sulfite to overcome the instability of sodium thiosulfate in acid solution; and (5) a buffer, usually boric acid, to provide reserve acidity and minimize the formation of bacterial sludge.

FIXER EXHAUSTION

The accumulation of silver is the principal factor in limiting the life of fixing solutions. As the bath is used, dissolved silver compounds tend to form insoluble complexes with thiosulfate, stopping fixing action. The gelatin of the emulsion tends to retain these complexes, as do the baryta (intermediate) layer and paper base of prints.

Film, because it is coated on a smooth and relatively impermeable base is not too prone to retaining these complexes. Paper base on the other hand, because it is fibrous and absorbent, retains residual silver with great tenacity. These retained complexes eventually decompose to form a brownish stain of silver sulfide, noticeable in non-image areas. Prints fixed in solutions with high silver content are virtually impossible to wash free of retained silver and thiosulfate complexes.

In a fixing bath intended for films, because of the far simpler wash problem, silver content can be permitted to rise as high as 6.0 gms per liter. This level normally occurs when film clearing time reaches twice that in fresh fixer, and at this point the solution should be discarded. When testing clearing time in used fixer and comparing it with that of fresh solution, be careful to use the same type of film, same agitation and the same solution temperatures in both instances, otherwise clearing time could vary considerably.

Film which looks clear in fixer might still be incompletely fixed. When milkiness disappears and the negative becomes transparent, 5 per cent of the original silver halide may still be present. Twice this clearing time would leave 0.25 per cent (5 per cent of 5 per cent) generally considered a safe level. Thus, the safest rule to follow is that correct fixing time of film is twice its clearing time.

For print fixers, residual silver content should not exceed 1.5 gms per liter. Because this tolerance is so much lower than that required for negative fixers, the solution can be used for negatives after it becomes useless for prints.

If a two-bath fixer system is adopted, extended image perman-

ence and chemical savings that can amount to well over 50 per cent can be achieved with routine "production" processing.

In a two-bath fixer system, the first solution accumulates most of the silver; the second solution accumulates much less, and at a slower rate. Most of the silver complexes remaining in the print upon immersion in the second bath are readily dissolved. The function of the second bath is to lower residual silver complexes in the print to a safe level.

In this technique, a gallon of first fixer "piles up" a dangerous silver content after about 200 8 x10 prints have been processed. The second fixer, still relatively fresh is then used as the first bath. After a total of five such cycles, discard both solutions and start with two fresh baths. Always drain prints and film well between baths to minimize carryover.

Compare the chemical saving. With a single fixer system each gallon of solution can treat about 75 8 x 10 prints. A two-bath system, however, can fix 200 prints in the same volume of fixer. *Expressed another way, six gallons of fixer uesd in a two-bath system will do work that would require over 13 gallons in a one-bath system.*

Print quality as related to residual silver content is consistently superior with this system. From figure 2 it can be seen that by the 200th print, at the end of the fourth cycle, the second solution contains less residual silver than would be found at the 50th print in a single fixer system. With a two-bath system, prints can thus have greater permanence, will not stain as readily and will tone much more easily.

WASHING

The purpose of washing photographic material is to remove chemicals which will adversely affect either its permanence on storage or subsequent treatment such as toning. Hypo and soluble silver salts must be removed or the photograph will eventually discolor, stain and fade.

Washing diffuses unwanted salts out of the material. Factors such as composition and exhaustion of fixer, water flow, turbulence and water temperature all affect wash efficiency.

To remove unwanted salts from the emulsion itself is a relatively simple procedure because the gelatin yields these without much difficulty. Nor does film base tend to retain unwanted complexes. Paper base and baryta coating however retain these complexes with remarkable tenacity. *This difficulty increases with overlong immersion in either the acid rinse or acid hardener fix.* (See table 1 for recommendations.)

Washing is most efficiently accomplished by using the smallest volume of water necessary to cover the material because, for a given flow of fresh water, dilution of the contaminated wash water can then be most rapid. Prints must be kept separated, and here mechanical agitation helps considerably. Make sure, too, that prints are well drained before they are put into wash. Rapid water flow helps remove contaminated solution from the surface of the material. It bears repeating that fixer from one material will diffuse into another and the total wash period must therefore be measured from the time the last film or print is placed in the water.

Temperature not only affects rate of wash, as shown in figure 3, but it also affects swelling and softness of emulsion. To minimize physical damage during wash, drying and subsequent handling, it is advisable to restrict water temperature to between 65 and 75°F.

WASH ACCELERATORS

It has been found that wash times can be greatly shortened, and removal of large quantities of unwanted salts facilitated, by the use of sodium sulfite as a wash accelerator. Used (*cont. on page* 55)

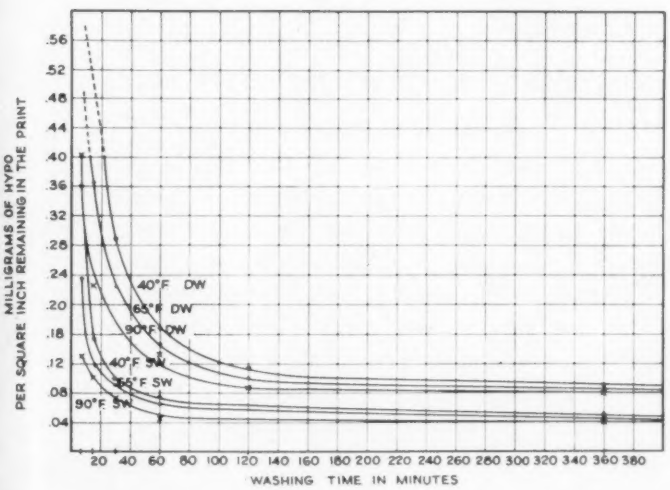


Fig. 3 How the temperature of the wash water affects the washing time of single-weight and double-weight prints. Although high temperature wash water is efficient in removing hypo, it has familiar and unhappy side-effects. Courtesy PSA, reproduced from the Journal of the *Photographic Society of America*, 6: 6-14, 1940.

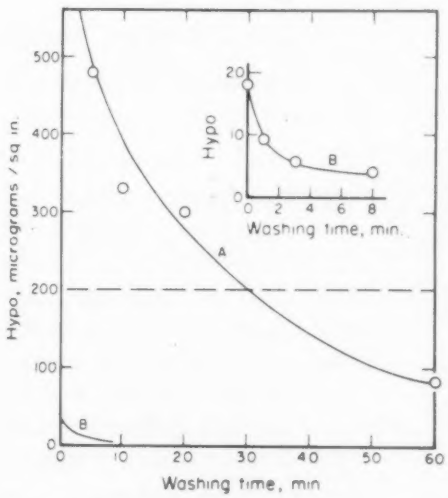


Fig. 4 Washing-time vs. hypo concentration for photo materials with usual processing (A) and with post-hypo bath in sodium sulfite solution (B); inset is enlarged version of B. From *Photographic Engineering*, V. 7.

PORTFOLIO NO.7

Torkel Korling, fabulous midwest freelance, brings a masterful ingenious technique to tough assignments, makes them look easy

When Torkel Korling does a chemical assignment, chemists ask whether he himself is a chemist; when he shoots in an iron foundry, experienced foundry managers assume that he once managed one himself. Photographers are certain that he must always have been one of those dedicated technicians who spends his every waking hour studying his craft. They're all off the beam. Trained as a forester in his native Sweden, Korling was attracted to photography on a visit to the U.S. and grew to love it as he discovered it made stimulating demands on his talent for matters mechanical. His technique is the despair of less inspired men; he sees the essentials of a complex setup in seconds, and generally starts shooting pictures in minutes. "My clients pay me to make photographs," he says, "not to stand around thinking." This is a nice way to work, if you're slick enough to get faultless pictures almost automatically. Korling is. Maybe his favorite breakfast has something to do with it: pancakes with cognac poured over them in place of syrup. A man who can handle that at 6 a.m. must be something special!

◂BANKING FROM A NEW ANGLE

Bank officers look like any other executives at desks, but banks have a quality all their own. In order to preserve this impressive feature in a series made for the Northern Trust Co., Chicago, Korling set his view camera up on a balcony, best spot for emphasizing architectural gingerbread in ceiling detail. Officers were silhouetted and available light brought out some detail on desks. Floods at sharp angle left dramatized relief by hardening black-and-white shadow effect. Result is one of the most unusual bank pictures ever made.

ORGANIZATION ▲ IS INVISIBLE

What looks at first glance very much like clutter on the desk of Dr. Percy Julian, eminent scientist, is just that. But it is orderly disorder; he knows what—and where—everything is. Wide-angle lens stopped down let Korling hold detail, make every square centimeter of picture work toward final design.

◂SOFT LIGHTS, HARD FOCUS

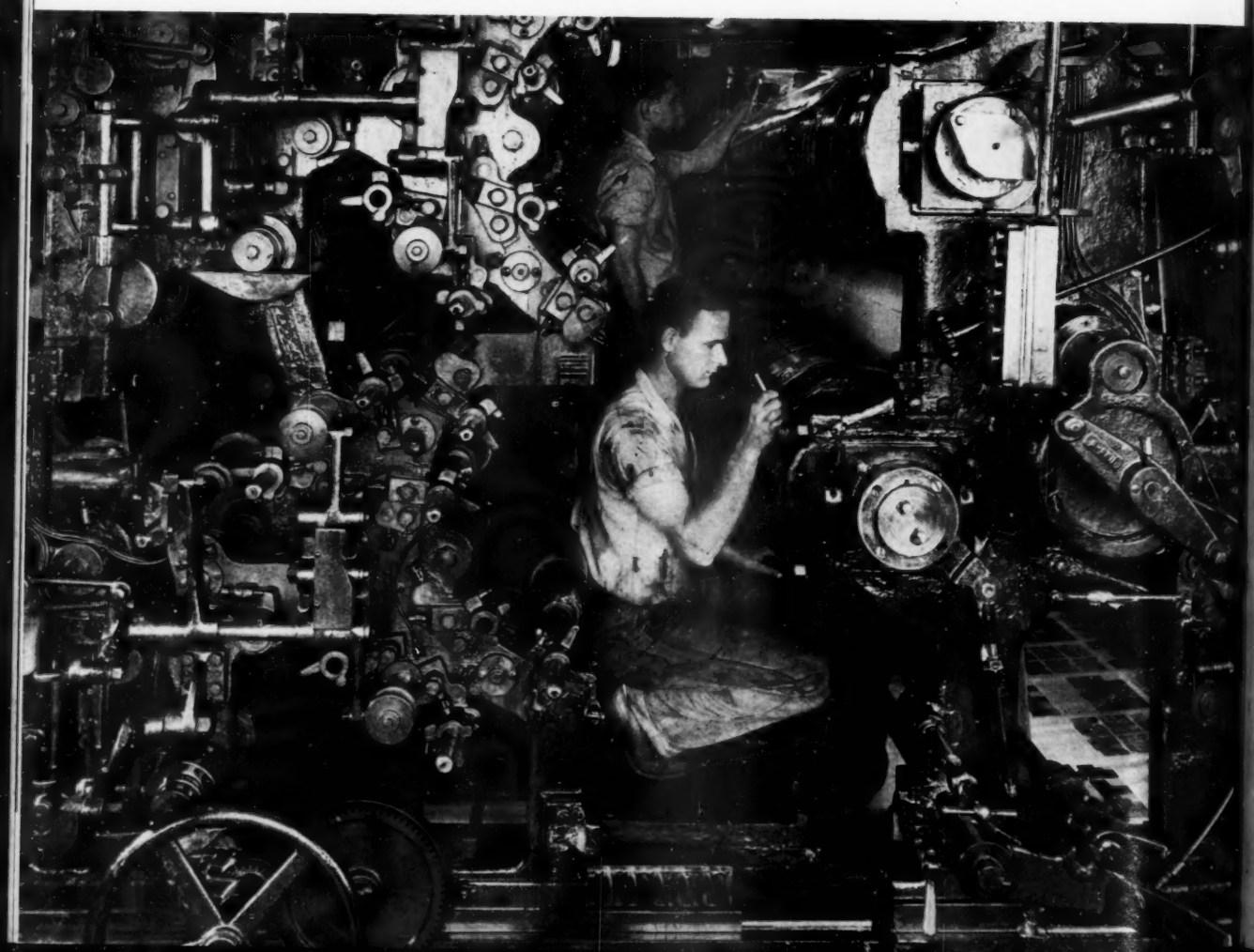
When real lightbox used in examination of steel rails at Inland Steel Co., Chicago, proved inadequate for pictures, Korling improvised one with sheet of paper, and plate of glass over desk drawer. Small light bulb in drawer provided enough illumination to balance with room light, outline templates.

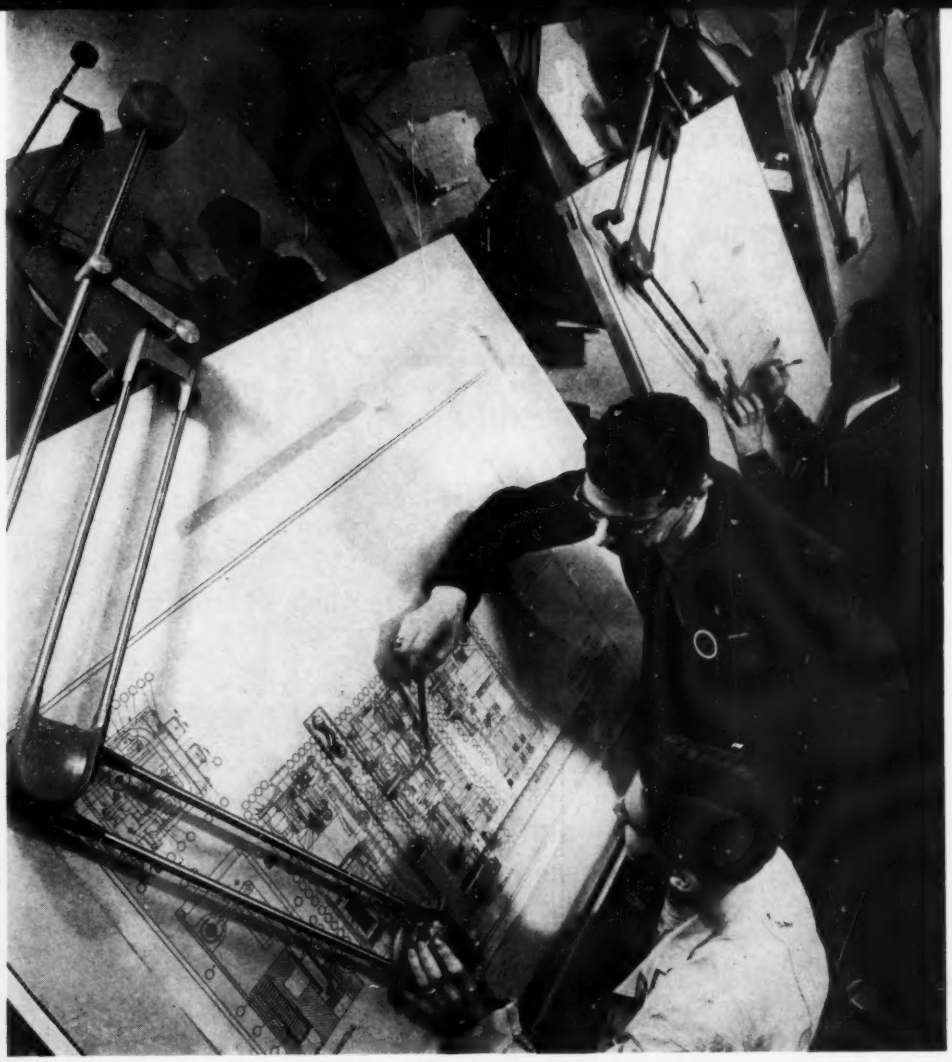
BOOBY-TRAP SHOT ►

This is the picture that separates the men from the boys. To outsiders it looks easy; professionals, who know how to handle a view camera, will immediately recognize that keeping the lines of this building square and straight in a head-on view is no mean technical achievement. Korling enjoys problems connoisseurs alone appreciate.

VIRTUOSO STUDY

Given a narrow aisle to work in, and a lot of irresistible mechanical detail to picture, Korling could hardly help turning out a small masterpiece. There's always plenty of paper in a printing plant. Korling hung strips of it across aisle, bounced speedlight off it for even illumination. Wide-angle shot was made at R.H. Donnelly, Inc., Chicago. ▼





FRESH VIEWPOINT ▲

Faced with the same old layout of drafting tables and squares, run-of-the-mill photographers would come up with the same old dull picture. Korling used sheer angle and sharp detail to enliven static scene. Picture was made at Rockford, Ill., plant of Woodward Governor Corporation.

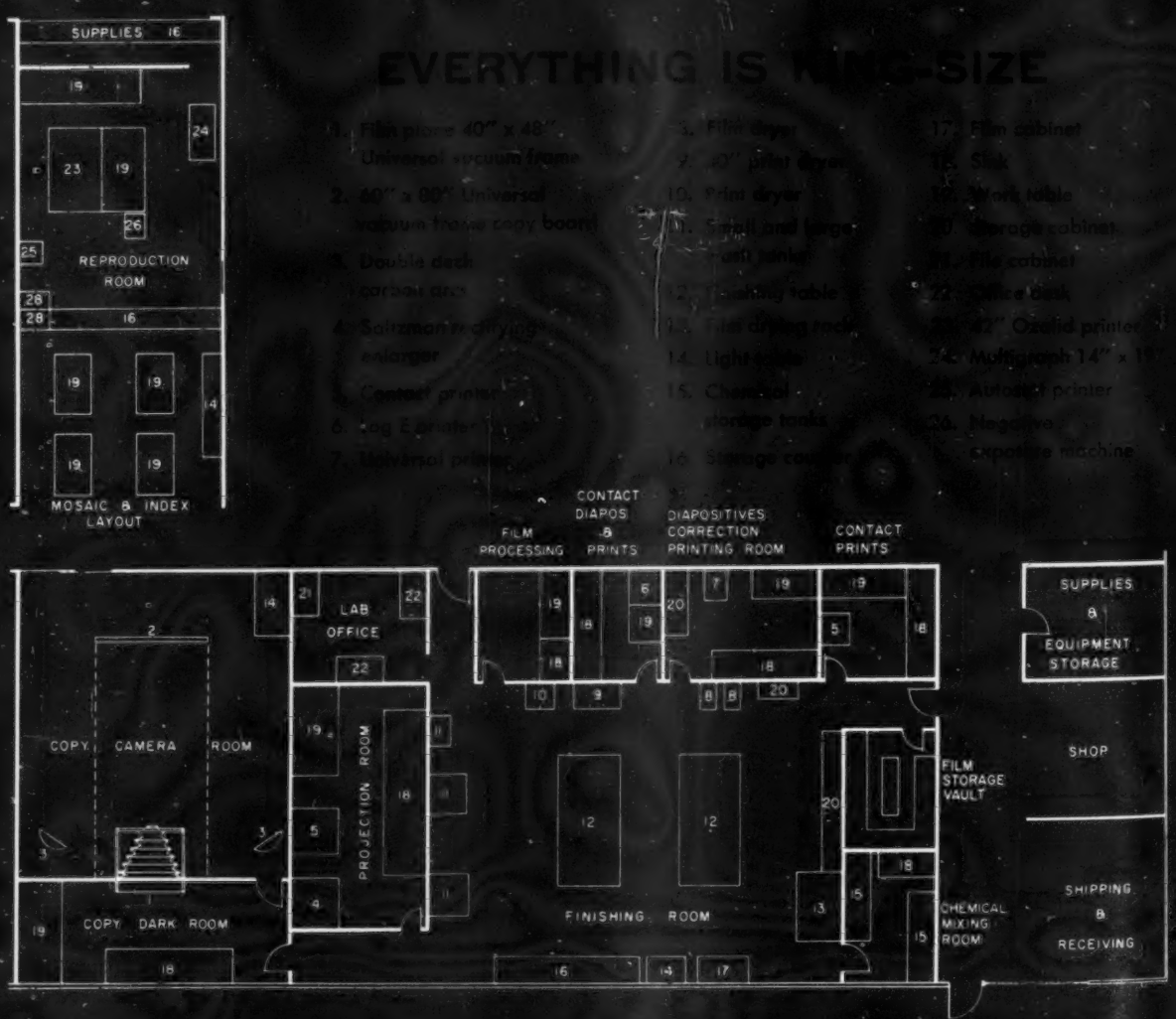
IT TAKES NERVE ►

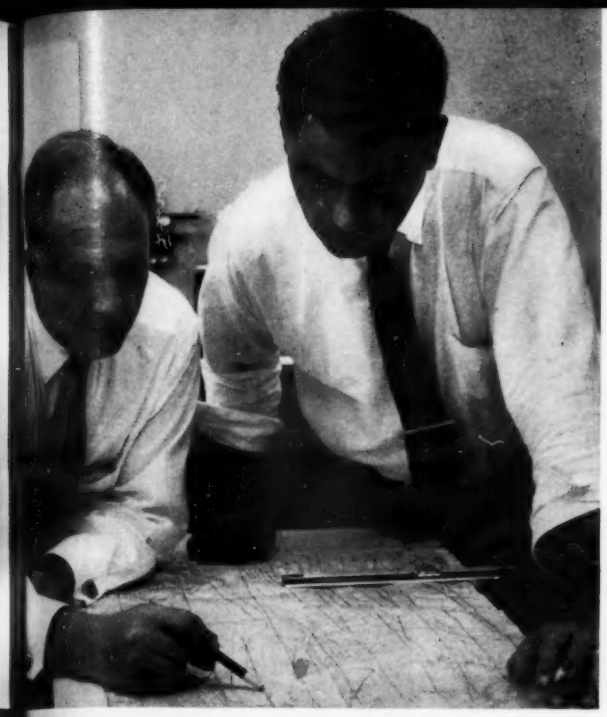
Depth of needle-sharp focus in this shot of hospital library will bring nothing but despair to anyone trying to duplicate it without knowing the secret. Even Korling couldn't make it in one shot—he took two negatives from same point, one focused on books, other on room. Then cut them apart at bookshelf upright, matched halves, taped them together at edge.

PHOTO DEPARTMENT ANALYSIS NO. 8

LOCKWOOD, KESSLER & BARTLETT, Inc.

Engineers first and foremost, this Syosset, N. Y., firm boasts a spare-no-expense photo department designed for precision as well as production. Photogrammetry forms bulk of lab's work.





Work on new aerial survey begins with Ray Sandbeck, Director of Photography, *left*, and Harold E. Johnson, Director of Photogrammetry, laying out flight lines.

Specifications lay down intervals at which pictures must be made. This camera is Fairchild; costly Swiss-made Wild cameras, collimating printers and stereoplotters are used too.

"I can get pretty much what equipment I need," says Ray Sandbeck, Director of Photography for Lockwood, Kessler and Bartlett, 69-year-old Long Island engineering firm, "but I have a lot of explaining to do if I order one thing and Mr. Bartlett [Ford Bartlett, president of the firm] discovers something else that'll do the job better!"

Awkward as the explanations may sometimes be, they don't happen very often. And Sandbeck realizes fully what a lucky break it is to be in an outfit in which the top brass takes a live interest in the operation of the photo department.

Administratively under the Department of Photogrammetry, the photo department reflects the interest all its members take in it. It is roomy, airy, and well-lighted where it doesn't have to be dark. Rooms designated for one purpose are used for that purpose exclusively, and are not used to store odds and ends of equipment that may come in handy sometime.

Clearest illustration of this is the copy camera room, as large as the total amount of space allotted to the photo department in some industrial plants. Dominated by the ceiling tracks and front end of the 40 x 48-in. Monotype camera, the room contains a mammoth 60 x 80-in. Universal vacuum frame copy board (one of the largest made), its compressor, two banks of double-deck arcs, and a light table, necessary in the work. And that's *all* the room contains. Attractive as its empty corners are to anyone with a lump of hardware not yet deteriorated to junk, its corners remain empty.

In the copy darkroom there are the vacuum frame for the camera, a sink, and a worktable. The absence of clutter at first gives the visitor an uneasy feeling—it is so unlike most photo departments. It is only after one has been there long enough to absorb some of the efficient, unhurried atmosphere that one realizes that what is strange is merely that everything has been figured out beforehand, in the engineering way. In the photographic field, where outfits take a sheepish pride in confusion, this is a revelation.

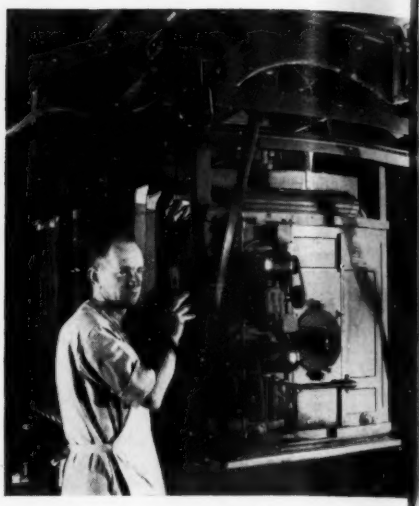
The Lockwood, Kessler and Bartlett photo department has a little more crucial function than a similar department in another firm where it would be responsible only for the odd public relations picture. In photogrammetry the photo is essential to the grammetry.

Ready to tackle any job in the engineering field, from preliminary surveys to construction supervision, the company has found itself veering more and more to aerial surveying. Their equipment is the most accurate on the market, based on the Wild line of photogrammetric instruments: the RC8 aerial camera, A5 and A6 stereoplotters, and collimating printer. Costs are staggering—the A5 stereoplotter is an investment of a cool $52,000

PHOTO DEPARTMENT ANALYSIS NO. 8
(continued)

Contacts made on the LogEtronics printer ("indispensable in aerial work" say technicians) are checked for overlap, *left*, and stapled together to make photo index. Specifications usually call for 60 per cent overlap, index so arranged as to expose negative number in corner of film. This is only first stage in transforming aerial photos to maps.

Hubert Swapp maneuvers 9000-lb Monotype camera to reduce index for more convenient use. Capable of focusing to three decimal places, camera is mapping mainstay.



—but results make it all worthwhile. On some maps points are located to within 1/50th in.

In acquiring a setup for aerial work, the firm soon found itself the possessor of eight aircraft, which they have organized into a wholly-owned subsidiary airline. This is to take care of the summer slack period, when leaves on the trees make aerial photography for mapping impossible. To keep its aircraft busy Lockwood, Kessler and Bartlett fly photography for other engineering firms and even take ordinary aerial photography jobs, such as doing Aerial Ektachromes of the eighteen holes of a golf course for *Newsweek*, and obliques of a dozen American cities for the covers of a business magazine. "We even get requests for straight commercial photography," Sandbeck reports. "If our schedule isn't too tight – and it usually is—we'll take it on."

Even with the tight schedule and the multiplicity of jobs that keep popping up, the LKB staff seldom looks ruffled. Part of the credit for this must go to the company's policy of supplying technicians with crisp, starched smocks. It does a lot for the morale to start the day in clean work clothes that you know are going to be laundered at the company's expense. Aerial work presents some problems that are not generally encountered in the usual run of photo lab operation. For example, it takes a while to get the hang of the kind of printing needed for mapping. Pretty pictures are out; shadow detail is absolutely essential, and if anything unpleasant happens to the negatives, retakes may run into a five-figure bill.

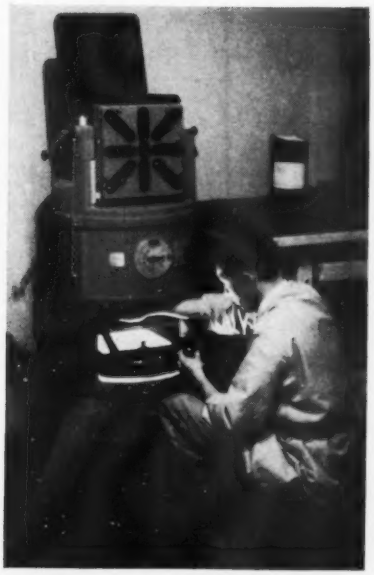
On the other hand, mechanical aids to accuracy have covered the field. The National Bureau of Standards calibrates all the process camera lenses for enlargement and reduction factor; the camera itself is equipped with counters that measure focus to three places after the decimal. It is motor driven along its overhead track.

In the space at our disposal it is impossible to give more than the briefest outline of the way this photo department operates, since it is the solar plexus of an organization that today may be called upon to reproduce a bridge and tomorrow assigned to an aerial survey of a jungle, making color pictures which will afterward be interpreted to show what proportion of the trees are of a certain economically valuable species. There is, however, one point at which the Lockwood, Kessler and Bartlett photo department comes into close contact with all other photo labs, everywhere. A sign in the finishing room expresses it best. It says: PHOTO LAB WORK ORDERS FOR YESTERDAY MUST BE PLACED NOT LATER THAN NOON TOMORROW.

Vice President and Chief Engineer George E. MacDonald uses photo index to lay out 125-mile highway in Columbia. Photogrammetry keeps costly ground operations to a minimum, increases accuracy.

Roy Sampson slips cyinder of aerial film into rack. Storage presents no particular problems except space, as entire building is air conditioned and humidity controlled.

Cronar sheet, used in later stage of mapping is hung up to dry, as Luis Durdanet checks giant blow-up of mosaic. Lab does all processing of graphic arts materials too.



Bill Brunn inserts correction lens, which compensates even the infinitesimal amount of radial distortion in fine aerial lens, as printer makes dead accurate diapositive. Frame, *left,* from Wild RC8 camera gives negative number, lens number, calibrated focal length, aircraft altitude, time at instant of exposure and level bubble to show trim of craft at that moment.

TECHNIFAX's A-V SCHOOL

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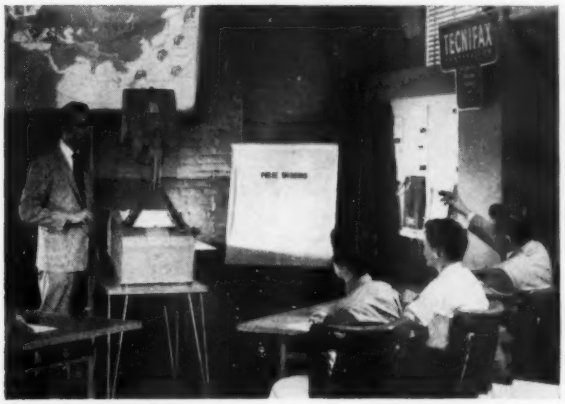

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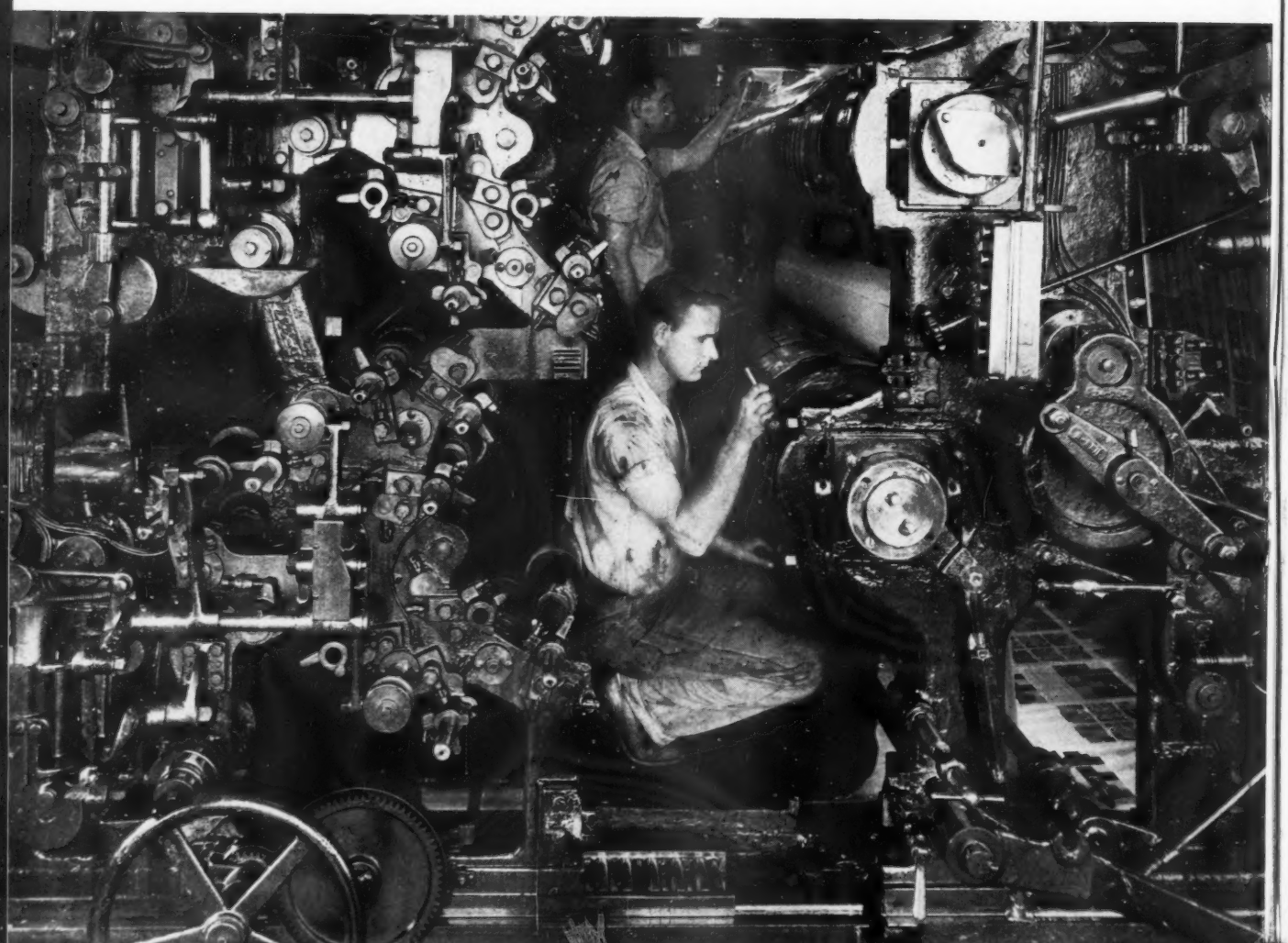
BOOBY-TRAP SHOT ►

This is the picture that separates the men from the boys. To outsiders it looks easy; professionals, who know how to handle a view camera, will immediately recognize that keeping the lines of this building square and straight in a head-on view is no mean technical achievement. Korling enjoys problems connoisseurs alone appreciate.

VIRTUOSO STUDY

Given a narrow aisle to work in, and a lot of irresistible mechanical detail to picture, Korling could hardly help turning out a small masterpiece. There's always plenty of paper in a printing plant. Korling hung strips of it across aisle, bounced speedlight off it for even illumination. Wide-angle shot was made at R.H. Donnelly, Inc., Chicago. ▼



FRESH VIEWPOINT ▲

Faced with the same old layout of drafting tables and squares, run-of-the-mill photographers would come up with the same old dull picture. Korling used sheer angle and sharp detail to enliven static scene. Picture was made at Rockford, Ill., plant of Woodward Governor Corporation.

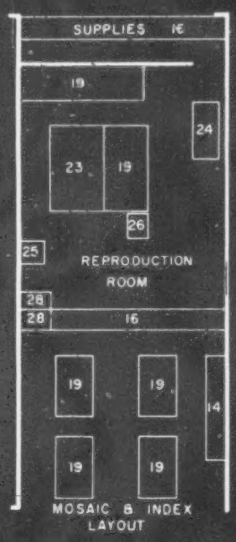
IT TAKES NERVE ►

Depth of needle-sharp focus in this shot of hospital library will bring nothing but despair to anyone trying to duplicate it without knowing the secret. Even Korling couldn't make it in one shot—he took two negatives from same point, one focused on books, other on room. Then cut them apart at bookshelf upright, matched halves, taped them together at edge.

PHOTO DEPARTMENT ANALYSIS NO. 8

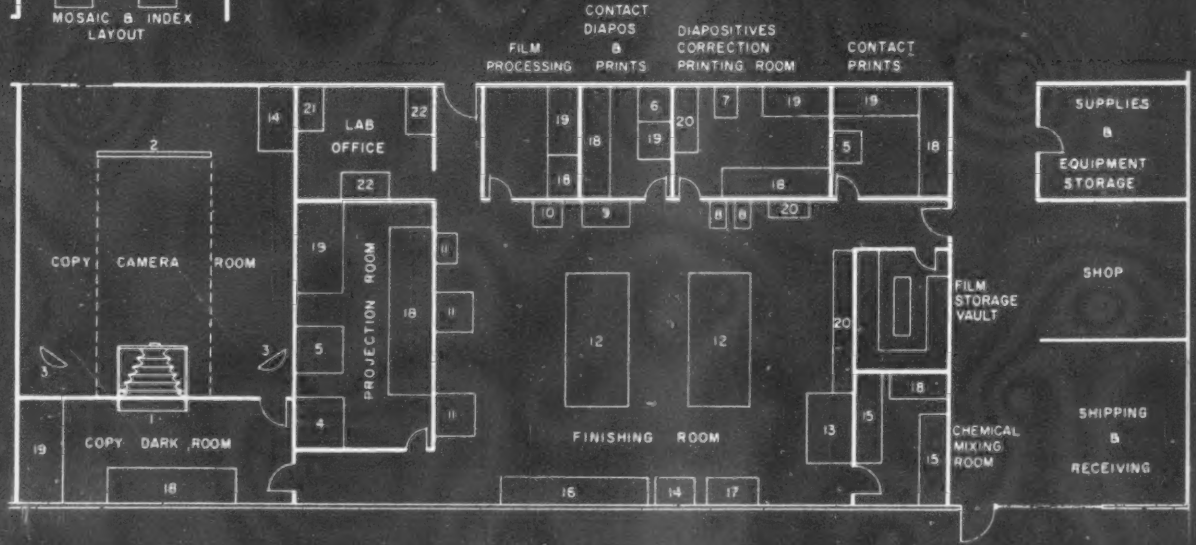
LOCKWOOD, KESSLER & BARTLETT, Inc.

Engineers first and foremost, this Syosset, N. Y., firm boasts a spare-no-expense photo department designed for precision as well as production. Photogrammetry forms bulk of lab's work.



EVERYTHING IS KING-SIZE

1. Film plane 40" x 48" Universal vacuum frame
2. 60" x 80" Universal vacuum frame copy board
3. Double deck carbon arcs
4. Saltzman rectifying enlarger
5. Contact printer
6. Log E printer
7. Universal printer
8. Film dryer
9. 40" print dryer
10. Print dryer
11. Small and large wash tanks
12. Finishing table
13. Film drying rack
14. Light table
15. Chemical storage tanks
16. Storage counter
17. Film cabinet
18. Sink
19. Work table
20. Storage cabinet
21. File cabinet
22. Office desk
23. 42" Ozalid printer
24. Multigraph 14" x 19"
25. Autostat printer
26. Negative exposure machine



Work on new aerial survey begins with Ray Sandbeck, Director of Photography, *left*, and Harold E. Johnson, Director of Photogrammetry, laying out flight lines.

Specifications lay down intervals at which pictures must be made. This camera is Fairchild; costly Swiss-made Wild cameras, collimating printers and stereoplotters are used too.

"I can get pretty much what equipment I need," says Ray Sandbeck, Director of Photography for Lockwood, Kessler and Bartlett, 69-year-old Long Island engineering firm, "but I have a lot of explaining to do if I order one thing and Mr. Bartlett [Ford Bartlett, president of the firm] discovers something else that'll do the job better!"

Awkward as the explanations may sometimes be, they don't happen very often. And Sandbeck realizes fully what a lucky break it is to be in an outfit in which the top brass takes a live interest in the operation of the photo department.

Administratively under the Department of Photogrammetry, the photo department reflects the interest all its members take in it. It is roomy, airy, and well-lighted where it doesn't have to be dark. Rooms designated for one purpose are used for that purpose exclusively, and are not used to store odds and ends of equipment that may come in handy sometime.

Clearest illustration of this is the copy camera room, as large as the total amount of space allotted to the photo department in some industrial plants. Dominated by the ceiling tracks and front end of the 40 x 48-in. Monotype camera, the room contains a mammoth 60 x 80-in. Universal vacuum frame copy board (one of the largest made), its compressor, two banks of double-deck arcs, and a light table, necessary in the work. And that's *all* the room contains. Attractive as its empty corners are to anyone with a lump of hardware not yet deteriorated to junk, its corners remain empty.

In the copy darkroom there are the vacuum frame for the camera, a sink, and a worktable. The absence of clutter at first gives the visitor an uneasy feeling—it is so unlike most photo departments. It is only after one has been there long enough to absorb some of the efficient, unhurried atmosphere that one realizes that what is strange is merely that everything has been figured out beforehand, in the engineering way. In the photographic field, where outfits take a sheepish pride in confusion, this is a revelation.

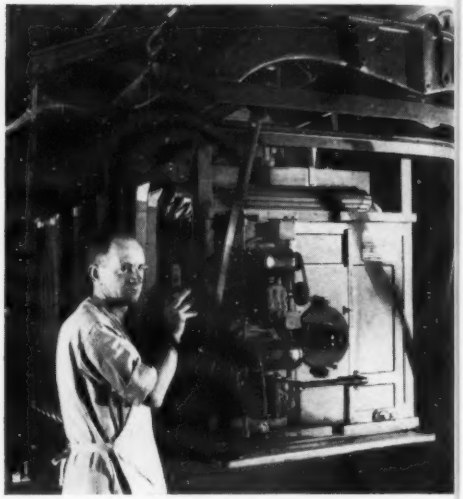
The Lockwood, Kessler and Bartlett photo department has a little more crucial function than a similar department in another firm where it would be responsible only for the odd public relations picture. In photogrammetry the photo is essential to the grammetry.

Ready to tackle any job in the engineering field, from preliminary surveys to construction supervision, the company has found itself veering more and more to aerial surveying. Their equipment is the most accurate on the market, based on the Wild line of photogrammetric instruments: the RC8 aerial camera, A5 and A6 stereoplotters, and collimating printer. Costs are staggering—the A5 stereoplotter is an investment of a cool $52,000

PHOTO DEPARTMENT ANALYSIS NO. 8
(continued)

Contacts made on the LogEtronics printer ("indispensable in aerial work" say technicians) are checked for overlap, *left*, and stapled together to make photo index. Specifications usually call for 60 per cent overlap, index so arranged as to expose negative number in corner of film. This is only first stage in transforming aerial photos to maps.

Hubert Swapp maneuvers 9000-lb Monotype camera to reduce index for more convenient use. Capable of focusing to three decimal places, camera is mapping mainstay.



—but results make it all worthwhile. On some maps points are located to within 1/50th in.

In acquiring a setup for aerial work, the firm soon found itself the possessor of eight aircraft, which they have organized into a wholly-owned subsidiary airline. This is to take care of the summer slack period, when leaves on the trees make aerial photography for mapping impossible. To keep its aircraft busy Lockwood, Kessler and Bartlett fly photography for other engineering firms and even take ordinary aerial photography jobs, such as doing Aerial Ektachromes of the eighteen holes of a golf course for *Newsweek*, and obliques of a dozen American cities for the covers of a business magazine. "We even get requests for straight commercial photography," Sandbeck reports. "If our schedule isn't too tight – and it usually is—we'll take it on."

Even with the tight schedule and the multiplicity of jobs that keep popping up, the LKB staff seldom looks ruffled. Part of the credit for this must go to the company's policy of supplying technicians with crisp, starched smocks. It does a lot for the morale to start the day in clean work clothes that you know are going to be laundered at the company's expense. Aerial work presents some problems that are not generally encountered in the usual run of photo lab operation. For example, it takes a while to get the hang of the kind of printing needed for mapping. Pretty pictures are out; shadow detail is absolutely essential, and if anything unpleasant happens to the negatives, retakes may run into a five-figure bill.

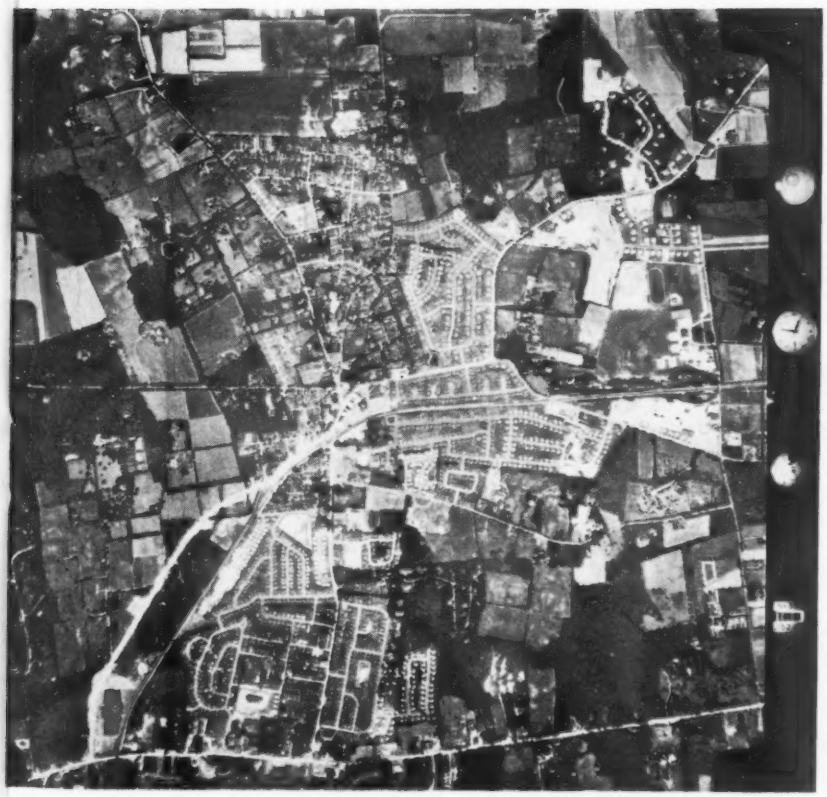
On the other hand, mechanical aids to accuracy have covered the field. The National Bureau of Standards calibrates all the process camera lenses for enlargement and reduction factor; the camera itself is equipped with counters that measure focus to three places after the decimal. It is motor driven along its overhead track.

In the space at our disposal it is impossible to give more than the briefest outline of the way this photo department operates, since it is the solar plexus of an organization that today may be called upon to reproduce a bridge and tomorrow assigned to an aerial survey of a jungle, making color pictures which will afterward be interpreted to show what proportion of the trees are of a certain economically valuable species. There is, however, one point at which the Lockwood, Kessler and Bartlett photo department comes into close contact with all other photo labs, everywhere. A sign in the finishing room expresses it best. It says: PHOTO LAB WORK ORDERS FOR YESTERDAY MUST BE PLACED NOT LATER THAN NOON TOMORROW.

Vice President and Chief Engineer George E. MacDonald uses photo index to lay out 125-mile highway in Columbia. Photogrammetry keeps costly ground operations to a minimum, increases accuracy.

Roy Sampson slips cyinder of aerial film into rack. Storage presents no particular problems except space, as entire building is air conditioned and humidity controlled.

Cronar sheet, used in later stage of mapping is hung up to dry, as Luis Durdanet checks giant blow-up of mosaic. Lab does all processing of graphic arts materials too.



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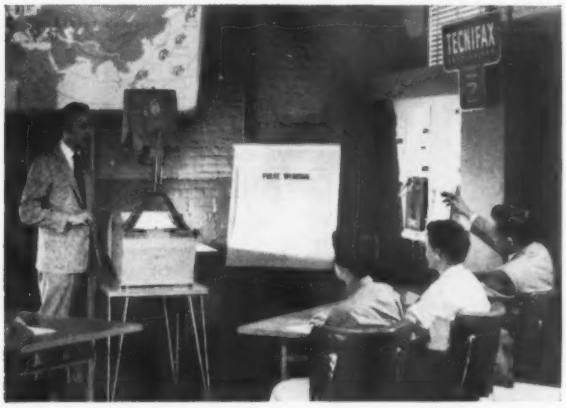

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N.Y. STAGES A-V WEEK

Mayor Robert F. Wagner, of New York, in a proclamation issued on July 23, has declared October 7-10 to be Audio-Visual Week, in honor of the Industrial Film and A-V Exhibition, which will be held on those days at the Trade Show Building, 500 Eighth Avenue.

Theme of the Exhibition will be "Sound and Vision as a Tool," and participating will be three agencies of the Federal Government—the U.S. Office of Education, which will display its educational material; the U.S. Army Pictorial Services Division, which will feature its A-V activities in the missile program; and the U.S. Naval Training Device Center, which will demonstrate the audio-visual techniques and equipment resulting from its A-V research and development programs. The United Nations Educational, Scientific and Cultural Organization (UNESCO) will have an exhibit showing the ways in which A-V equipment can be used: from university level to the outdoor classrooms of many undeveloped countries.

Commercial exhibits will cover 97 rooms on two whole floors of the building. Seminars and film showings will be held by many of the principal related trade organizations, and a lecture program rounds out the attractions.

PROGRAM OF WEEK'S FEATURES

Tuesday, October 7th

9:30 a.m. N.V.P.A. Seminar: Morning Session

12:00 m. Exhibition Opens

12:00 m. National Visual Presentation Association luncheon in conjunction with the Sales Executives Club from New York

1:00 p.m. F.P.A.'s Showcase and Conference on Sponsored Films

2:00 p.m. N.V.P.A. Seminar: Afternoon Session

2:00 p.m. Lecture—Kenneth H. Goddard, Manager, Audio-Visual Services Department, United States Chamber of Commerce: "Simple Audio-Visual Techniques for Organized Business"

3:00 p.m. Lecture—R.A. Maurer, Technical Advisor, Motion Picture Department, International Business Machines Corporation: "In-Plant Production of Motion Pictures"

4:00 p.m. Lecture—James A. Moses, Chief, Film Distribution & Utilization Branch, Army Pictorial Service Divi-

7 SPEAKERS

Christian S. Bauer

Dr. I. F. Cypher

sion: "The A-V Program in the Army—Its Distribution & Unusual Techniques"

4:00 p.m. F.P.A.'s Showcase and Conference on Sponsored Films

5:00 p.m. Lecture—Keith Culverhouse, Director of Sales Presentations, Television Bureau of Advertising, Inc.: "Film & Slides—Right or Wrong"

6:00 p.m. Exhibition Closes

Wednesday, October 8th

12:00 m. Exhibition Opens

12:00 m. Industrial Audio-Visual Association Luncheon & Regional Meeting

1:00 p.m. F.P.A.'s Showcase and Conference on Sponsored Films

2:00 p.m. Lecture—Lt. Colonel C.S. Bauer, USAF, Chief, Audio-Visual Aids & Manuals Branch, Special Training Devices Division: "The USAF In-Service Motion Picture Production Program"

3:00 p.m. Lecture—Richard T. Cartwright, Naval Aircraft Maintenance Training School Director, Grumman Aircraft: "The Use of A-V in Industrial Education"

4:00 p.m. Lecture—Laurence K. Hamilton, Vice President in charge of Sales, Tecnifax Corporation: "Communication and Human Relations"

4:00 p.m. F.P.A.'s Showcase and Conference on Sound Slidefilms

5:00 p.m. Lecture—Richard J. Brown, National Sales Promotion Manager, U.S. Plywood Corp.: "Uses of Visual Aids in Sales and Promotion."

6:00 p.m. F.P.A's Showcase and Conference on Sponsored Films

6:00 p.m. Lecture—R.R. Pomeroy, Head of the Visual Projects & Recordings Branch and E. B. Nowicki, Audio-Visual Division Head, U.S. Naval Training Device Center: "Audio-Visual Engineering-Military Training"

7:00 p.m. Lecture—John J. McCarthy, Marketing, Personnel, Training & Practices Consultant, General Electric Company: "Visuals in Training and Public Relations"

9:00 p.m. Exhibition Closes

Thursday, October 9th

9:00 a.m. Educational Film Library Association's Board Meeting

12:00 m. Exhibition Opens

12:00 m. Magnetic Recording Industry Association Luncheon and Meeting

1:00 p.m. F.P.A.'s Showcase and Conference on Sponsored Films

2:00 p.m. Round Table Session; presented by Members of the Educational Film Library Association: "The Film Libraries & Industry"

3:00 p.m. Lecture—Richard Wallace, Technical Director, the Harwald Co. "Film Inspection and Cleaning."

4:00 p.m. Lecture—R. C. Rheineck, Chief-Engineer, C.B.S. News: "Magnetic Sound in 16mm Film Production"

4:00 p.m. F.P.A.'s Showcase and Conference on Sponsored Films

4:30 p.m. Workshop Session; sponsored by the Metropolitan Audio-Visual Association in cooperation with the Long Island Audio-Visual Association and the New York State A-V Council under the supervision of Dr. Irene Cypher, President, Metropolitan-New York Audio-Visual Assn., and Assoc. Prof. of Education, New York University: "Television in Education"

6:00 p.m. Exhibition Closes

7:30 p.m. Banquet at the Hotel New Yorker

Friday, October 10th

12:00 m. Exhibition Opens

12:00 m. New York State A-V Suppliers Association Luncheon and Meeting

1:00 p.m. F.P.A.'s Showcase and Conference on Sponsored Films

2:00 p.m. Lecture—Arthur Gagliotti, Deputy Representative to the United Nations-U.N.E.S.C.O.: "Audio-Visual Methods in International Relations"

3:00 p.m. Lecture—Laurence K. Hamilton, Vice President in Charge of Sales, Tecnifax Corporation: "Thruways to Learning"

4:00 p.m. Lecture—Charles E. Luminati Director of A-V Services, Great Neck Public Schools. "The Techniques of Modern A-V Equipment & Utilization in Instructional Materials"

The above listings are only tentative and subject to change. The complete detailed program can be obtained by writing to Industrial Exhibitions, Inc., 17 East 45th St., New York 17, N.Y.

WHO WILL MAKE PRINCIPAL ADDRESSES

Kenneth H. Goddard

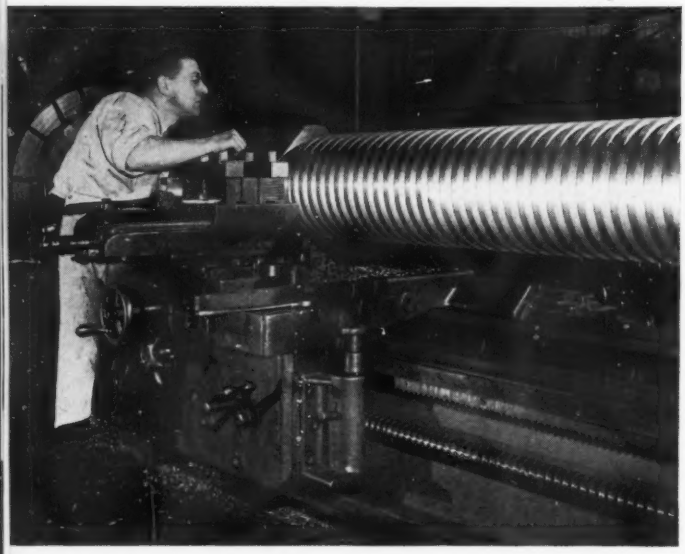
Dr. R. L. Conter

Laurence K. Hamilton

Keith Culverhouse

Richard J. Brown

STAN ROSOL, Ford Motor Co., Dearborn, Mich., made this picture of a machinist cutting thread on a very large screw. Before it came to PMI, prints of it were used for publicity and display. Rosol used a press camera, multiple flash and fast pan film for this industrial study.



STANLEY D. SIMMONS, New York University Bellevue Medical Center, New York City, was faced with showing white rats in a transparent plastic container against a white wall. Solution: silhouette rats by showering the light of a No. 5 flashbulb on wall. Speed Graphic Super-XX film, 1/100 sec. at f/32. Picture used for brochures and articles.

PMI's Monthly

READERS' SHOWCASE

Five of PMI's readers supply pictorial solutions to industrial photo problems.

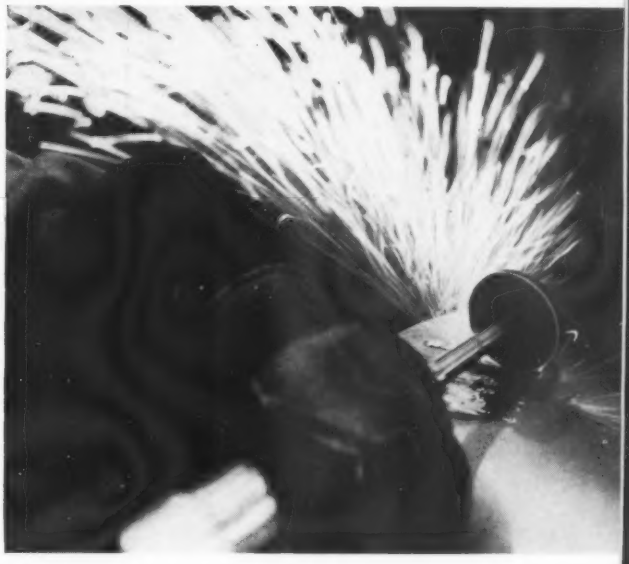
This month's symposium is on the methods employed to stop industrial editors. That is, stop them from flipping on to the next picture. Now what stops the editor, any editor will tell you, is what stops the reader. Editors have a pile of statistics to prove that certain subjects do this almost sure-fire. The list covers most two- and four-legged creatures. We won't add to the list to include purely industrial subjects. Pictures should sometimes sneak up on the reader, and besides we hate lists. But we do present some pictures which stopped us and which stopped editors we never even knew existed until recently. What did it? There is a bit of the spectacular in each of the five samples: from the man working with jeweler's exactness on what looks like the biggest bolt in the world to the bulldozer chugging up to the skyline. There is an animate or moving object in each of them. All were made with thought and skill.

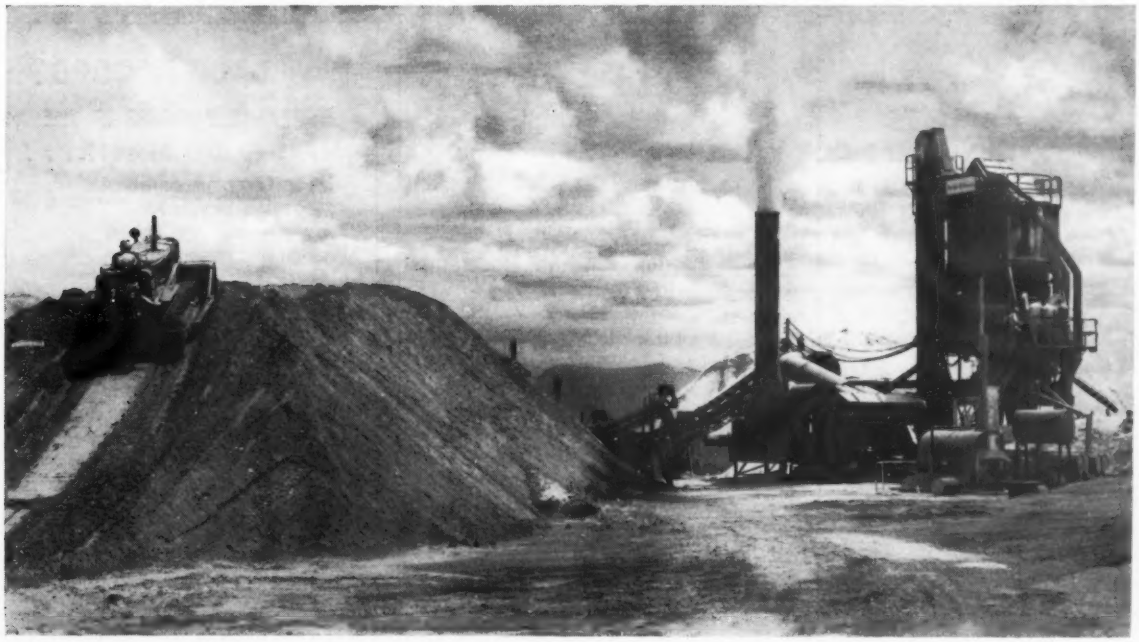
You are invited to send in your pictures for this feature. Here are the details:

There are two rewards for each of the pictures chosen. The first is knowing that your picture will be seen by appreciative fellow professionals. The second is $10.00. Please include your name and your company's name, a note about the picture and how it was used, and the technical data. Send them to SHOWCASE, PMI, 33 W. 60, New York 23, N. Y.

W. LEON REIGLER, The Upjohn Company, Kalamazoo, Mich., chose a stylized approach for this portrait of a personnel director backgrounded by personnel. The assignment was an illustration for a company magazine personality piece. Reigler used a 4 x 5 Linhof camera, Super Panchro-Press, Type B film and a 90mm wide-angle lens, slow shutter, existing illumination for the portrait.

CHARLES L. TERNES, General Motors Photographic, Detroit, Mich., made a set of pictures of the Pontiac Motor Car Assembly Plant in Pontiac Mich., which were picked up in the roto section of the *Detroit News*. Below is one of them. Nikon S2, Plus-X rated at 400. "Average exposure 1/25 sec. at f/5.6."





R. W. RICHARDSON, Barber-Green Company, Aurora, Ill., intended to picture one of his company's asphalt mix plants, *right*, at a road building site in Kansas. But he wisely changed his mind, included the bulldozer chugging up the sandpile thereby piquing the curiosity of any amateur construction superintendent. Picture found its way into print as a magazine illustration. Super D Graflex, 4 x 5 Tri-X film, 1/125 sec. at f/16, orange-yellow filter.

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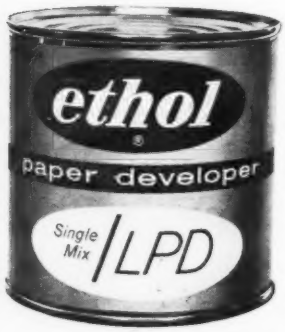

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SCIENCE NOTES

A new look at the world's most sensitive "amplifier"—photographic film—was presented last month by Jack F. Hamilton of Eastman Kodak Research Laboratories.

Speaking in Montreal at an international meeting on nuclear particle photography, Hamilton discussed his work with the electron microscope in studying the photographic mechanism by which light produces a silver image.

By subjecting special photographic film to simultaneous pulses of light and electric field, he was able to study the motion of tiny charged particles within a single photographic grain, Hamilton said.

His experiments at Kodak Research Laboratories showed that electrons liberated by light in a silver bromide grain have some freedom of movement, because the negatively charged particles move toward the positive side of an applied electric field. By arresting development after a short period of time, Hamilton could see a silver image along the side of the grain closest to the positive plate, he said.

Electrons, freed by exposure to light, trigger the reaction that will convert the entire grain of silver, the photographic process attains an amplification of about a billion to one and becomes the most sensitive amplifier known to science.

Hamilton said that, under the electron microscope, the latent image displacement caused by an electric field can be measured by statistical means. The conductivity of a photographic grain to silver ions can be determined by delaying the light flash after the electric pulse, he explained. The time that the electrons "wander" after light exposure is measured by delaying the electronic pulse after the light flash. Detailed results of such measurements were also given in Hamilton's report.

Atomium under X-rays

Anybody who doesn't know by now that the Atomium at the Brussels International Exhibition is a 9-atom metal crystalline cell, magnified 165 billion times, just hasn't been reading the newspapers.

What hasn't received as much publicity as it might have, is that the Atomium is something of a landmark in nondestructive testing. Since it is a daring structure, or at least an unconventional one, every step in its

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erection was carefully checked to see that it delivered the necessary safety factors, in order to make sure it could stand the strain of holding 2,000 visitors at the same time.

This was accomplished with the help of industrial X-ray. Over 2,000 radiographs were made of the welding in the central tower, the bipodes, the crossbeams, and other structural members.

Radioactive isotopes were also brought into play. Films used were, of course, the native Belgian Gevaert Structurix D7 and Structurix D10.

D10 is a high-sensitivity stock that is used for conventional X-ray pictures; D7 is a slower, high-contrast emulsion, used mainly for work with radioactive isotopes, which by their nature give a softer picture.

Giant slides

Overlapping color photomicrographs forming lantern slides 24 in. long by the standard 3¼ in. high—for projection by the standard lantern slide projector—have been made

C. Burton Clark and giant slides

by C. Burton Clark, Research Mineralogist of the Harrison-Walker Refractories Co., Pittsburgh, to aid in the study of mineralogical changes in refractories during service in copper metallurgy.

Reflected light was used to illustrate the microstructure of the refractories because many of the minerals were found to be opaque. The sections were polished and a mechanical stage was used to transport them across the stage of the microscope. Illumination was by means of carbon arc. Lantern slide glass of the required size was obtained directly from the manufacturer.

Five consecutive transparencies were mounted together, representing a band of brick ¼ in. long perpendicular to the working face, at a magnification of 80X. Thus, a set of three long color slides illustrated the microstructure of the brick from the slagged working face to a distance of ¾ in. into the interior, portraying minute detail of the infiltration of metallic copper and copper minerals into the brick structure.

Light Chopper

A thin visible or infra-red light beam bouncing off a six-sided rotating mirror, surrounded by five fixed mirrors, then shining out through a slit forms the mechanical light chopper developed by Westinghouse for testing how fast electronic devices react to light. Should have wide TV, and high-speed photographic applications, since it delivers a stream of precise, ultra-fast light pulses.

Safety in colors

The National Bureau of Standards has just come up with a set of reference standards in photoelectric colorimeters, for measurement of opaque color specimens.

4¼-in. enameled squares, the colors are: safety red, international orange, safety orange, schoolbus chrome yellow, safety green, and safety blue.

The last three items in this column were culled from the excellent *Industrial Research Newsletter,* published by Armour Research Foundation. —THE END

(1) Snap it . . . see it! (2) Slip it into a mount, and (3) project it as big as you want.

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Two sizes are available—2¼ x 2¼, and 3¼ x 4 for use in existing "lantern slide" projectors.

These slides cost about ⅓ as much as conventional slides. But the real saving is in the time and effort that it takes to put any picture on the screen. Send in this coupon for detailed information, plus booklet, "On Your Feet," loaded with hints for your next speech.

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by Arnold Eagle

INDUSTRIAL MOTION PICTURES

It's sync or swim when beginners plunge into sea of sound systems

Sound plus sight more than double up to make movies effective. Although many motion pictures can get by without the use of sound—particularly those made for technical purposes and those which are for the most part incidental to an in-person presentation—lack of sound can put a severe limit on motion pictures.

Like many persons involved in motion pictures, I was brought up in the visual rather than the audio part of the business. Photographic experience helps in many phases of cinematography, but it is of little use when it comes to putting sound on film. I hope the next few columns are of use to the photographer in the same predicament as I was. Most persons concur that any alert man with good hearing can master sound technique.

For general showing, optical sound is needed. In the end, the film bears a sound track alongside the picture image. Perhaps overly simplified, the silver deposits in the sound track control the amount of light coming from an exciter lamp to a photo-electric cell in the projector. The phototube converts the varying signal from the film into electric current of varying strength, which is amplified and converted to sound.

Tricky business

There are a number of problems in the sound-on-film process which occur both in the recording and projecting operations, and sometimes degenerate the sound. A number of electro-mechanical distortions and photo-chemical problems like film grain and optical resolution create extra noises that distort the sound.

Aside from these there are other problems, and space permits presenting only a few of them. Sound recording for film can be grouped into two main categories, direct live synchronous sound recording (lip sync), where the visual image and the sound, especially dialogue, is recorded simultaneously; or the dubbed-in sound, where the sound is added to the film after it is shot and edited. This sound may be recorded at different locations, at different times, away from the camera.

Single or double

Direct live synchronous recording on film can be achieved either by single system or double system shooting. In the single system, the sound is recorded in the same camera on the same film as the visual image is exposed. In the double system, this sound is recorded simultaneously on a separate recorder that operates on an AC synchronous motor as does the camera. So the camera and the sound recorder run at the same speed. Some of the advantages of single system are that it is compact, easy to transport, easy to handle (two men can operate it quite easily; in an emergency, it can be handled by a single operator) and there is no trouble with synchronization—as the sound and image are exposed on the same film.

There are two main disadvantages which greatly limit this seemingly practical process. First, the sound on a 16mm single system camera is hard to edit. As the sound on the film is 26 frames in advance of the image, it is impossible to cut a take without cutting more than a second of sound from it. The only place where an editor can cut a single system film is where there is more than one second of silence. The alternative is to re-record the sound from the single system film to a separate sound track for editing. This naturally degenerates the already changing quality of single system sound.

Films vary

The sound recording is done on comparatively fast film used for the picture image. This has an inherent

grain which makes best quality sound recording impossible.

(In the double system film sound recorder, the sound is recorded on very slow, fine grain stock, especially designed for sound recording and capable of high image resolution. Kodachrome, because of its grainless quality, makes one of the best single system film stocks.)

The single system camera is most useful for newsreel type films, where only dialogue is recorded, and speed in shooting to completion is of the essence.

The magnetic tape recorder has displaced the film type recorder for shooting double system direct live sync sound. The sound can be played back immediately and the director and actors can be assured that the sound is okay. Later, magnetic tape is usually re-recorded on an optical film recorder so that it can be printed with the picture.

It is usually no problem to sync magnetic tape when sprocketed magnetic tape (16 mm, 35mm or 17mm wide) is used. Unsprocketed ¼-inch tape presents special problems. Even when the tape recorder is driven by a synchronous motor unsprocketed ¼-inch tape slips enough to advance or delay the timing of the sound. The only satisfactory way ¼-inch tape can be used for sync recording is if the tape recorder is fitted with a special 60 cycle sync head. This puts a sync signal on the tape which when played back is picked up by an electronic control gadget which speeds up or slows down the playback motor depending on the spacing of the signals. If the tape slipped or stretched the signals come in slow and the motor is slowed down or speeded up to compensate. Thus the tape will be in perfect sync.

In shooting double system, the camera must be made practically noiseless by means of sound-proofing or a blimp because of its close proximity to the microphone. It must have a synchronous AC motor that runs only at 24 frames per second. The tape recording equipment must be outside the hearing range of the mike.

Many 16mm film makers find a single system camera like the Auricon ideal for double system shooting, as the camera runs on a 24-frame synchronous motor and is noiseless. These workers record the sound simultaneously on a synchronous tape recorder, and use only the image part of the film in the camera. The sound track which is also made by the single system on the film, can be used to sync up the separate track in sound editing.—THE END.

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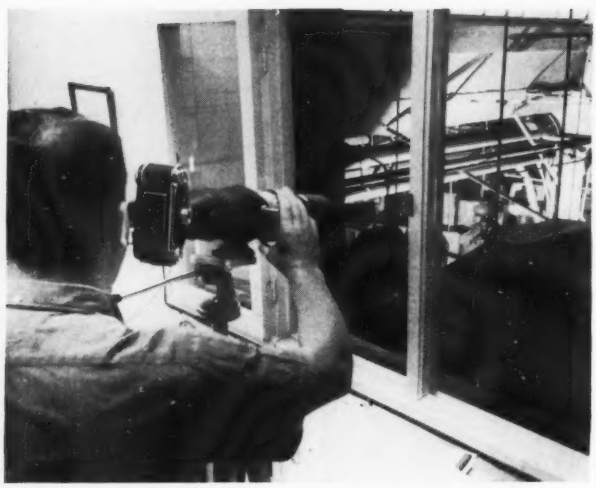
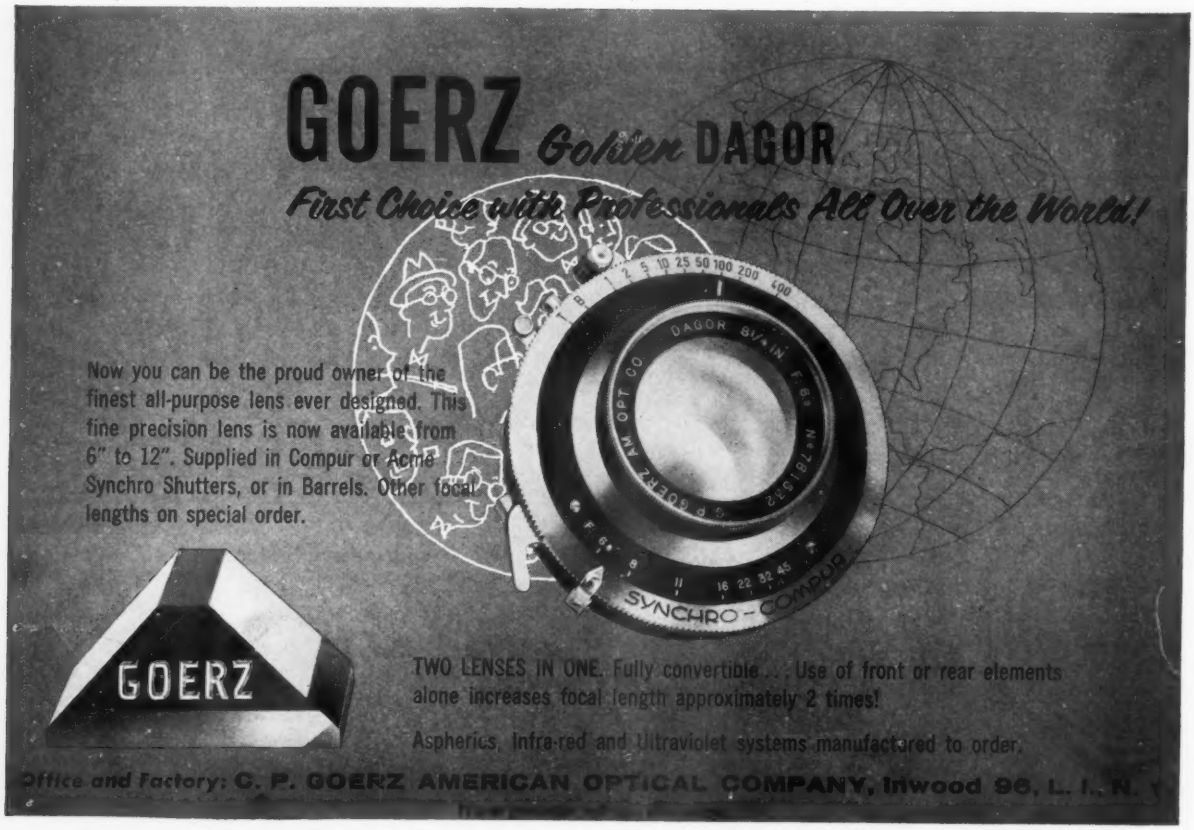


AiResearch photog Bill Valdez on safety watch.

His Exakta VX loaded with Super Hypan, and a 400mm Astro-Berlin f/5 out front, Bill Valdez, photographer for AiResearch Manufacturing Co., Los Angeles, recently spent the day with Rex Birdsong, a machinist employed by the firm, but Birdsong didn't hear about it until it was all over. Valdez's assignment: to photograph signs of accident proneness at different times during the day.

The pictures revealed that Rex showed traffic fatigue when he arrived at work, got into his stride in the second hour. Hunger for lunch hit alertness in third hour, but after lunch Rex was on the ball. Sixth hour coffee break helps stave off fatigue, but by the end of the day he is really tired.

Stationed 45 feet away, Valdez was not visible to his subject until he finally let him in on the secret. Exposures were 1/5 sec. at f/8, and development was in old reliable D-76.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Attention wanders as a result of traffic fatigue, but by second hour Rex has settled down to job and accident proneness drops.

Before and after lunch present different pictures: hunger hits alertness; lunch break restores it but fatigue is becoming a problem.

Coffee break fights fatigue and accident proneness, but employee is tired at the end of the day. Last hour is dangerous.

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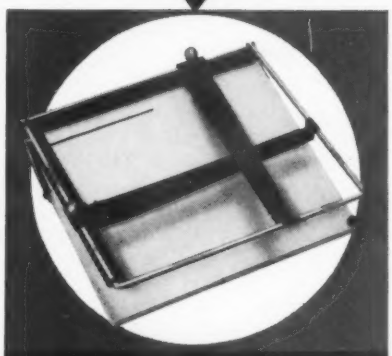

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PHOTO BOOKS IN REVIEW

Printing Color Negatives, *Eastman Kodak Co., Rochester, N. Y.* (1958). 75 cents.

This 56-page Kodak Color Data Book is the most comprehensive treatment to date on the technique of printing pictures on Kodak Ektacolor paper (formerly called Type C paper).

Making prints on Kodak's relatively new color paper is still not child's play; but this well-organized treatise should go far toward helping the user attain the truly astonishing quality possible with negative-positive color.

Not neglected are means to achieve good prints without specialized equipment. Discussion of some of the more elegant tools (which some consider necessary for speed and economy) is also included, along with a method for making transparencies and a mention of black-and-white prints from color negatives.

The anonymous editors are careful to point out that innovations in making prints are coming thick and fast; that what is said represents the best *current* information available to them. If not final, the booklet is certainly authoritative. — C.MCP.

F. Y. I.

(*Continued from page 6*)

with photographic manufacturers.

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Association items (II)

The 1958 Annual Technical Conference of the Society of Photographic Scientists and Engineers will be held at the Manger Hotel, Rochester, N. Y., October 6 to 10.

On October 20 and through the 24th, the 84th Semi-Annual Convention of the Society of Motion Picture and Television Engineers will take place at the Sheraton-Cadillac Hotel, in Detroit. The theme will be "Films and Television in Industry and Education." —THE END

IN-PLANT TEST

Telescopic extension for Nikon with electric motor drive

SPECIFICATIONS: Extension unit for Nikon with electric motor drive. Permits remote operation. Consists of an aluminum pole adjustable from 20 in. to 48 in., and a periscope finder system. Weight, under 3 lb. Neither a firm delivery date nor price are yet available.

Masked and gowned, Flip Schulke stands out of the way and aims periscope.

Flip Schulke, Black Star staff photographer, Miami, reports by telephone: "One of the best features of this gadget is that the doctors like it. The old way of photographing operations used to involve either setting up a huge mirror, or shooting at an oblique angle.

"The drawback with the mirror was that it couldn't be set up in the few moments that generally elapse between the decision to operate and the time when the patient is wheeled into the operating room.

"Shooting obliquely makes it hard to get the kind of pictures that doctors like, for they have most interest in seeing the condition at the scene of the disorder just as it was before correction. Since surgeons keep the incision as small as possible —just leaving themselves enough room to work—getting pictures that show anything from an oblique angle was next to impossible.

"Moreover, doctors seldom had time to set up better conditions for the photographer to work under, even when they wanted the pictures badly.

"This Nikon extension unit doesn't solve all the problems, but it's certainly a step in very much the right direction. (*cont. on following page*)

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"I set my lens at 2½ feet and, using the new Plus-X shot at 1/125 at f/11. The pole was at full extension, and I got no blur or evidence of camera movement. The shots I made at 1/60 showed a little camera shake, but whether it's due to vibration from the motor, or just instability of the photographer, I'm not quite sure. I suppose 1/60 is a pretty long time to expect a camera to hold still at the end of a long pole. With fast film and operating-room lighting it's unnecessary.

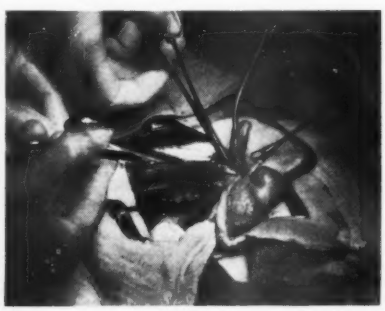
"I have had some mixed reactions from doctors on the unit, but in the main they like it. First of all it keeps the photographer out from underfoot and secondly it makes most of the big-mirror setups, such as those used on television unnecessary.

"The anti faction's point of view was summed up very briefly by one surgeon who looked at the equipment and stated flatly: "You're not going to hang that thing over any of my operating tables!"

"His objection was that the camera and extension unit weren't sterile, and that dust or particles might fall from it and bring about a serious infection in the patient, since the camera had to be directly above the incision.

"In my test I got around this by swabbing the camera and extension unit lightly with alcohol. It was either do that or not get the pictures. I had a few uneasy moments, but it speaks highly for the camera's finish that it held up beautifully. The extension unit could, I suppose, be sterilized in an autoclave without too much damage, but this isn't recommended for cameras. I suggest that for operating-room work Nikon make some sort of plastic bag or case that fits over the camera, and can be boiled.

"I got one unexpected bonus with the periscope finder: it appears to correct for parallax. Its field is circular, and well within the limits of the negative."—THE END



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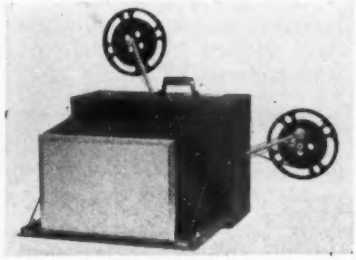

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Get more information. Circle 444, page 59

PHOTO FIXING

(*Continued from page* 31)

after the fixer, a 2 per cent solution of sodium sulfite will cut wash times of negatives and prints by about two thirds.

Films and single weight prints are bathed in the two per cent sodium sulfite solution for at least two minutes, and double weight prints are bathed at least three minutes. An efficient one- or two-minute water rinse should be used after the fixer to minimize hypo carry-over and prolong the life of the sulfite solution. When this procedure is followed, a gallon of two per cent sodium sulfite can be used for about 200 8 x 10 prints.

From figure 4, it can be seen that *with this bath, followed by a five-minute wash, the level of residual hypo is far below that attained at the end of an hour's wash in plain water.* The use of a sulfite bath will also assist in the elimination of unwanted silver complexes. Shorter wash times mean that wash equipment is free to handle the next batch of material sooner, which amounts to an increase in plant capacity.

HYPO ELIMINATORS

For convenience of definition, hypo eliminators may be considered those solutions which oxidize thiosulfate to neutral sulfate, which is harmless to the photographic image. They *do not* facilitate removal of *large quantities* of hypo and are normally employed only near the end of the wash. Eliminators followed by toning can be used in specialized instances to remove last traces of hypo from prints for archival purposes.

They tend to soften and blister the emulsion. Their use with negative materials is not recommended. And with prints, rehardening of the emulsion is often necessary when these solutions are employed. An additional disadvantage is that the peroxide-ammonia variety of eliminators are unstable and must be prepared just before use.

STABILIZERS

Stabilization, employed after development, converts unused silver halides into compounds which are relatively resistant to light, heat and humidity. These compounds are often permitted to remain in the emulsion, saving the wash time. For highly specialized applications, where a photographic

(*Continued on following page*)

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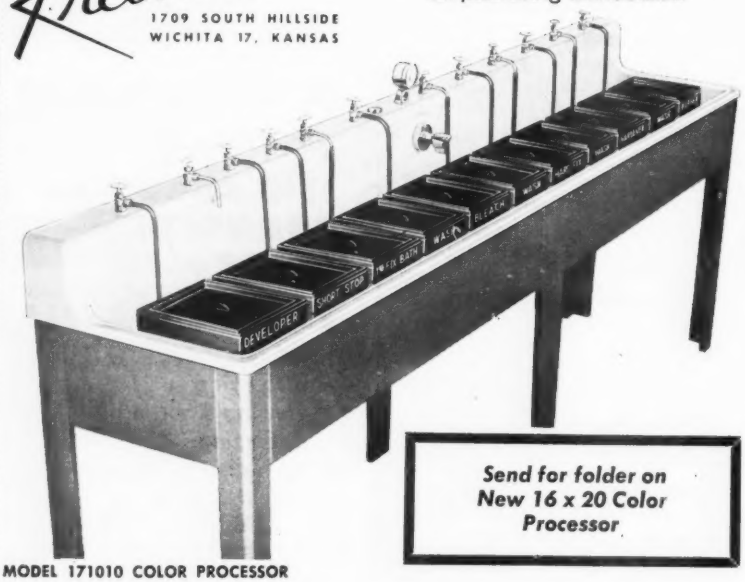

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Get more information. Circle 447, page 59

PHOTO FIXING

(*from preceding page*)

image is wanted in the shortest possible time, a satisfactory result is possible in seconds. The results however are not as permanent as those yielded by normal fix and wash methods.

TESTS

To maintain a close check on the efficiency of processing, two simple tests for the processed material are recommended for occasional use. One is for residual silver; the other is for residual hypo. The solutions used are as follows:

Residual silver, film & paper
(to test proper fixation)

	Avoirdupois	Metric
water	4 oz.	100 cc
sodium sulfide	36 grains	2 gms

Residual hypo, film & paper
(to test completeness of wash)

	Avoirdupois	Metric
water	24 oz.	750 cc
28% acetic acid	4 oz.	125 cc
silver nitrate	¼ oz.	7.5 gms
water to make	32 oz.	1.0 liter

(Solution should be stored in a sealed brown bottle away from strong light. Avoid contact with skin and clothing otherwise stains will result).

For both tests, select a clear area on the print or negative margin or use a blank piece of material processes at the same time. After wash, wipe off excess water, place one drop of test solution on the area, let stand for two minutes, then rinse briefly. Resultant stain for both tests will approximate the eventual discoloration of the material.

With the hypo test for prints, under normal conditions, stain of the base will usually be less than that of the emulsion. If you have anything but a very light stain with film the wash procedure is inadequate.

For prints, using either the residual hypo or silver test, again, only a very light stain is acceptable.

"Drain well" is a caution we have mentioned a couple of times. It must be stressed that carryover during transfer of "clumps" of prints could prove fatal to either an adequate wash or to the life of shortstop, fixer, or sodium sulfite solution. Allow enough time for drainage or even eliminate excess solution with a windshield wiper blade.

THE END

FREE LITERATURE

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AUDIO-VISUAL

DaLite Screens **266**
Da-Lite Screen Co., Inc., 20-page catalog describes, offers specifications and prices for screens; contains information on audio-visual presentation.

Film Strip Projector **225**
Abbe Films and Equipment Co. Catalog sheet describes 300-watt 35mm film strip projector.

Film Cases **226**
Excelsior Fibre Case Co., Inc. Catalog sheet gives prices of fiber shipping cases for 16mm film, salon prints, filmstrips and records and recording tapes.

Table Viewer **227**
Camera Optics Mfg. Corp. 6-page folder outlines 2 x 2 projection viewer with 6-in. screen which folds to 6½ x 11 x 3 in. for transport.

Government Films **265**
United World Films, Catalog of 200 U.S. Government sound movies.

Translucent Screens **264**
Klearcite Screen Co. Price list for four kinds of translucent screens in 24 sizes.

Rear Projector **228**
Triangle Projectors Inc. 4-page brochure describes 16mm projector-rear-screen unit.

CAMERA & LENS

Calumet Close-ups **268**
Calumet Manufacturing Co. Periodical, *Calumet Close-ups,* offers information on a number of phases of industrial photography; contains product news on Calumet cameras and processors.

Identification Unit **267**
Graflex, Inc. 8-page booklet describes identification photography with the Graflex 35mm Identification Unit.

Recorder **229**
Flight Research, Inc. 4-page publication, the *Recorder,* discusses new products and equipment of this instrumentation camera maker.

Hulcher 70 **230**
Charles A. Hulcher Co., Inc. 4-page folder describes the Hulcher 70 2¼ x 2½ rapid sequence camera.

Alpa Cameras **231**
Karl Heitz, Inc. 32-page catalog illustrates and describes the Alpa Reflex camera, its applications and accessories.

Novoflex **232**
Voss Photo Corp. Catalog sheet lists prices and specifications of Novoflex extension bellows for 35mm cameras.

Telephoto Lenses **235**
S. P. Bushnell & Co., Inc. 8-page folder gives details and prices of Spacemaster Telephoto Units incorporating telescopes and mounts for interchange-

LogEtronic automatic electronic dodging and exposure control *makes the difference* in photographic printing and enlarging* by "bringing out" automatically, every brilliant highlight and detail from a negative.

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able and non-interchangeable-lens cameras for telephoto photography.

EQUIPMENT

Silver Reclaiming **269**
States Smelting and Refining Co. 6-page folder describes reclaiming silver from photo fix with Tamco Silver Collectors.

Temp-Control Sinks **270**
Bar-Ray Products Corp. Catalog sheet charts specificatons and prices of stainless photo sinks with built-in water mixing, cooling and heating equipment.

Film Holders **271**
Hoffman Professional Camera Co. Price list for film holders in sizes 8 x 10 to 12 x 20 and for film holder repair.

Darkroom Equipment **272**
Voss Photo Corp. 40-page catalog of Kindermann photographic darkroom equipment.

Automatic Processor **273**
Hyran Inc. 4-page folder describes the Hyran single strand photographic paper processor.

Color Film Processor **274**
Rolor Industrial Corp. Catalog sheet details Rolor Universal Color Film Processor and Rolor Gaseous Burst Cycling Timers. Includes prices.

Processing Equipment **275**
Grafic Products Inc. 16-page catalog lists stainless steel tanks, trays, color processing equipment, washers and allied darkroom equipment.

Print Dryer **236**
Johnke Manufacturing Co. 4-page folder outlines 10 variations of the American matte print dryer.

Megalume **237**
Nems-Clarke Co. 4-page folder describes and gives prices of Megalume portable electronic flash units and accessories.

Negative Filing **238**
The Nega File Co. 20-page catalog of filing materials, equipment and supplies for negatives, prints, motion pictures, filmstrips and slides.

SUPPLIES

Spectrum Analysis **277**
Eastman Kodak Co. Data sheet displays characteristic curves, gradient curves, time-gamma curves, spectral sensitivity and other data on Kodak Spectrum Analysis and "Spectroscopic" plates and films.

Gevaert Films **276**
Gevaert Company of America, Inc. 12-page booklet details the Gevaert films and papers for professional photos.

Background Swatches **244**
Bulkley Dunton & Co., Inc. 6-page folder displays a watch of seamless background paper for each of the 43 color variations available from this firm.

GRAPHIC ARTS

3-Color Printing **279**
Durst, Inc. 4-page folder describes the application of the Durst Laborator 3S enlarger-camera and its pin registration accessories in three-color short-run color lithography.

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Lacey-Luci **248**
Lacey-Luci Products Co. 10-page folder describes process cameras and reproduction equipment in detail; price list included.

Metalphoto **249**
Metalphoto Corp. 4-page reprint describes Metalphoto's photosensitive aluminum plates.

Arc Lamps **250**
Strong Electric Corp. 4-page brochure presents this firm's arc lamps for photo-mechanical reproduction systems.

Drafting Standards **251**
The Filmsort Company. 8-page reprint outlines Bell Telephone Laboratories' drafting standards for microfilmed engineering drawings.

Got a Match? **252**
Macbeth Corp. 4-page brochure discusses factors in matching colors throughout the graphic arts processes.

Gevaert Films and Plates **278**
Gevaert Company of America, Inc. 8-page booklet outlines 17 Gevaert films, plates and papers for process work.

Repro Paper News
Andrews Paper & Chemical Co., Inc. *Reproduction Paper News* periodically summarizes current technical innovations and patents. PMI's Readers' Service Department, 33 W. 60th St., New York 23, N.Y., will forward requests made on your letterhead.

MOTION PICTURES

Variable Shutter **281**
Pellegrini-Piek. 16-page booklet describes variable-shutter installation on Bolex H16, H8 and H16 reflexes.

Lighting **282**
J.G. McAlister, Inc. 16-page catalog of lamps, stands, light control, accessory equipment.

Exposure Meters **283**
Albion Optical Co. 6-page reprint discusses spectral, temperature and illumination response of exposure meters applied to professional motion pictures.

Arri **284**
Camera Equipment Co., Inc. 8-page booklet describes the Arri-flex 35 Model IIB, its features and accessories.

Splicer **285**
Camera Equipment Co., Inc. 6-page folder details the Ace "Clear Vision" film splicer and Mylar splicing tape for use with it. Includes prices.

SERVICES

Color Tips **286**
Meisel Photochrome Corp. 4-page "Information Sheet No. 4" explains the importance of grey cards; offers tips on negative-positive color.

Filmstrips **287**
Frank Holmes Laboratory, Inc. 12-page booklet gives production details and instructions for supplying copy for color filmstrips and slide and stereo duplicates. Includes prices.

Color Price List **260**
Jack Ward Color Service, Inc. 7-page price list covers color film processing and printing services of this New York City firm.

Color Reproduction **262**
IdentiColor Laboratory. Folder, price list detail the work of this South Pasadena, Calif., slide copy and filmstrip laboratory.

Sheet Film Color Work **263**
Atkinson Stedco Color Film Service. Price list of 48-hour processing for Ektachrome, Anscochrome and Super Anscochrome sheet film offered by this Hollywood, Calif., firm.

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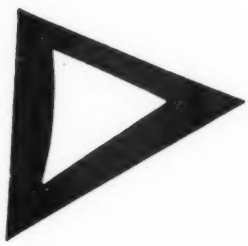

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"Cronar" Sheet Films 113

Conversion of a major part of its portrait press and industrial films from acetate to "Cronar" polyester photographic film base has been announced by the Du Pont Photo Products Department.

The change brings about some nomenclature revisions as follows: Old "Superior" Press film is now "Cronar" Press; High Speed Pan, Arrow Pan and X-F Pan have "Cronar" as prefixes.

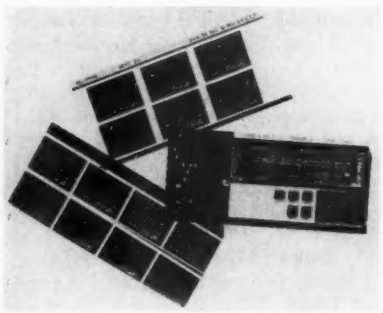
The new base offers the following advantages in sheet film, it is said: Films lie flat wet or dry. They dry 20 to 25 percent faster than acetate film. "Cronar" sheets load easier into film holders because they are tough and durable but thinner than acetate. They permit very sharp enlargements since thin, smooth polyester base eliminates optical distortions. Films do not dimple and distort if inadvertently dried without proper removal of water droplets. They have super-hardened emulsions which permit high-temperature processing and high-temperature rapid drying without base distortions. They incorporate outstanding dimensional stability. They take retouching more easily. Since polyester base contains no solvents which can eventually affect photographic images adversely, archival keeping is more easily obtained.

"Cronar" polyester photographic film base has one-third the tensile strength of steel and will withstand more than 15,000 foldings before breaking.

Actifilm 116

Actifilm, diazo-type microfilm in card weights and card sizes, has been introduced by Ozalid's Microline Products Group.

Actifilm is available in 3 x 5, 4 x 6, 3¼ x 7⅜ (tabulating card), 5 x 8 and



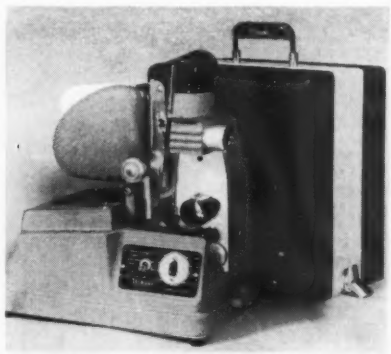
special sizes. One 3 x 5 Actifilm card holds up to six full 35mm frames; a 5 x 8 card holds over 100 16mm images.

The material is a clear film base with a diazo coating. Actifilm is printed by means of an Actifilm printer or a Unitizer from microfilm rolls, then developed by dry process in room light.

Synchrowink 117

The DuKane Corporation "Synchrowink" filmstrip projector features push button frame changes in 1/20 sec.

A 10-ft. remote pushbutton control cord is standard equipment with the 15 lb. projector, and a 35-ft. cord is available as an accessory. The new projector is suited for automatic synchro-



nization of pictures with tape-recorded sound, it is said, since anything which will complete an electrical circuit can operate the mechanism. The Synchrowink 300-watt projector, DuKane model No. 576-47, lists at $144.50, equipped with a 3-in. lens.

Quadlite 114

The Mole-Richardson Quadlite utilizes four reflector floods 10 in. square and 2 in. thick. It weighs 10 lbs. The unit mounts on a Baby pedestal and may be tilted in any direction by use of a quadrant furnished as an accessory. Provision is made for stacking one Quadlite on another by means of stacking posts. Each flood is controlled by a separate switch.

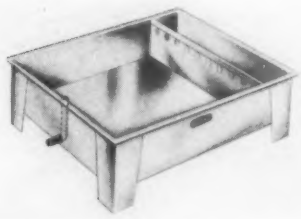
Motion Study Projector 115

Flicker-free projection at speeds of 6 to 20 fps in forward or reverse is said to be possible with the Weinberg-Watson modified version of the Kodak Analyst Projector, introduced by Camera Equipment Co.

The modification features single frame operation in both forward and reverse. The projector offers quick transition from continuous to single frame operation and back again remote control. Price: $795.

Spray Washer 120

Leedal's spray print washer accommodates work up to 11 x 14, holds 20 to 25 8 x 10 single weight prints at a time,



and can be used without a sink. A vertical spray pipe introduces fresh water uniformly at all levels to prevent matting, it is said. A perforated baffle drains the water by overflow. The spillover trough has 1½-in. stainless steel drain that can be hooked up to rubber hose or permanent piping. The unit is equipped with legs.

New Sinar Shutter 119

A four-bladed Packard-type shutter, with 1/25th sec. and B as well as M and X synchronization, can be used with any lens from 47mm wide-angle up on the Sinar view camera. The Sinar shutter can be operated entirely with a hand release or a cable release. A second cable release automatically closes the shutter as the film holder is inserted. A red signal indicates when shutter is open. Sinar standard shutter including two cable releases and sync cord is $129.

New Opaque Cloth 103

A new, opaque coated fabric which remains pliable in both hot and cold temperatures, possesses an unusually long flex life, and has excellent resistance to edge wear, is now being produced by the Du Pont Company's Fabrics Division.

Designed primarily as a heavy-duty camera bellows material, Du Pont "Armalon" ethylenic resin coated fabric is expected to have many potential applications in aircraft and industry, as well as in darkroom and audio-visual curtaining.

"Armalon" is available in black and gray and is produced in two gauges—.007" and .010". The material comes in 36-inch and 42-inch widths. A sample swatch is available.

Remote Control Unit 111

The Vanguard Radio Remote Control can operate tape recorders, cameras, movie and slide projectors, electronic

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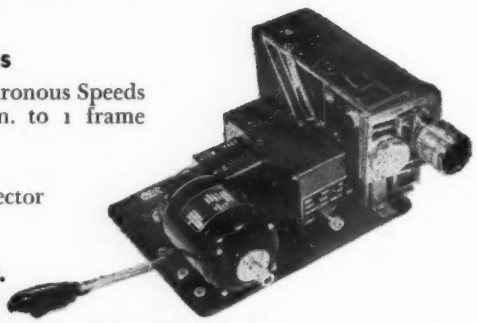

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flash units, flashguns and other types of equipment. Its transmitter operates on one 1½-volt and one 22½-volt battery, while its receiver works off 115-volt household current. Complete battery is 2½ x 1½ x 3½ in.; the receiver measures 5 x 7 x 3½ in. The unit operates on the 27.255 MC Citizens Band, requiring no license. Price: $59.95. Audio-Visual and industrial models are $69.95.

New Projector Optics 109

Unique among 35mm filmstrip and slide projectors is the new Proflector I. It uses a reflection optics system, which

it is said results in a marked improvement in picture brightness with surprisingly low lamp wattage. The maker claims light output from a 150-watt lamp in the Proflector I provides more screen illumination than is obtained from some 500-watt projectors now on the market. The optical system is the equivalent of a 2 in. f/1.7, completely color corrected projection lens. A 40-in. wide image is obtained with a projector to screen distance of 8 ft.

Projection Tables 112

A three-model line of projection stands is being offered by Cousino, Inc. Visual Van Senior for movie and opaque projectors is 43 in. high and has three recessed 16 x 24-in. shelves. It is $45.

Visual Van Junior is 30 in. high and has two shelves, each 16 x 24 in. Price: $39.95.

Visual Vanette is 42 in. high; has three 15 x 20-in. shelves, is $32.95.

Overhead Slide Mounts 107

The cost of new Ozalid Projecto Mounts is such that these holders for overhead projector transparencies are said to be expendable, thus eliminating time and labor in reclaiming mounts from obsolete transparencies. Projecto Mounts are 9¢ in quantity for the 10½ x 12 size and 10¢ in quantity for the 10½ x 14 size.

Verifax Offset Adapter

The Kodak Verifax Offset Adapter (Model 2) features a horizontal storage base which holds a supply of offset masters. Masters are fed one at a time, directly into the alignment and transfer

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sections of a Verifax copier.

The alignment mechanism permits lateral positioning of the Verifax image on any standard offset master up to 10 x 16 in. An overhead bail stop provides vertical image adjustment even when the offset master is the same width, or narrower than, the Verifax matrix. Price: $98.50.

For additional information on any new products item, circle the appropriate number on the readers' service card attached to page 91

Signet 80

The Kodak Signet 80 Camera features injection type film loading—the film is dropped into place, the film leader injected into the take-up chamber, and the camera is closed. The film advance lever is moved until it stops, and the camera is set on exposure "1" ready to take pictures. Other features: two-stroke rapid-advance lever; combination range and viewfinder with 1 to 1 viewing ratio; a 50mm f/2.8 Kodak Ektanar lens interchangeable with a 35mm Signet f/3.5 and an 80mm Signet f/4; a built-in, photo-electric exposure meter calibrated in EVS numbers. Its shutter has speeds from ¼ to 1/250 second plus a "B", X and M flash synchronization. All lenses focus from 2½ ft. to infinity, and automatically couple to the range-finder. Price $129.50 list. A field case is $14.50 list. A Microscope Adapter is $69.

Sensitometer 110

Edgerton, Germeshausen & Grier, Inc., offers the Mark VI Sensitometer, an intensity scale type sensitometer, employing a xenon-filled flash tube as the light source. Three different capacitor circuits are built into the instrument to provide exposure times of 1/100, 1/1000 and 1/10,000 second, selected by pushbutton.

Filters may be inserted to change the color of the light source from daylight to incandescent quality. A reduction in total amount of light may be effected by insertion of variable area filters with no color distortion, it is said. Price complete $600.

NuArc File-O-Matic 104

File-O-Matic for storing offset plates comes in several different units: cabinets, wall bracket, hanging brackets and floor dollies. Cabinets are made for 10 x 16 plates or 17 x 20—both in two options: for either 100 or 200 plates. Wall brackets and hanging brackets each have 100 hangers, and the floor

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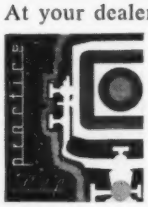

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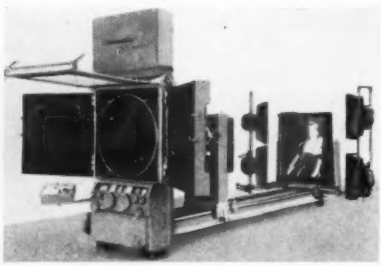
dollies have 200 hangers. Cabinets can be stacked three high to conserve space. All steel equipment is in silver hammerloid. Hangers are numbered. File-O-Matic cards attach to the plates when hung. Duplicate cards can be filed for index use.

New Flexmaster 108

A new Mayfair Flexmaster Mini-Versal bar light intended for motion picture work takes advantage of recently introduced 375-watt reflectorflood bulbs. It uses four lights, but folds up into a space roughly the size of a shoe box. Besides compactness, the unit features pushbutton dimmer switch and universal adjustment of the lights, which are connected to the control box with flexible arms. Price: $13.95.

Klimsch Regent 105

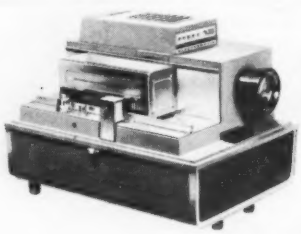
Repro Graphic Machines, Inc. announces the new Klimsch Regent, a 24 and 32 horizontal process camera with tape focusing. Color features, such as



masking bars, darkroom operated diaphragm control, filter disk, and compensator for various thickness of screens, masks, and film are optional, as is a straight line image reverser for a 24 or 32-in. lens.

Argus Projector 118

The Argus Electromatic color-slide projector offers the user the alternatives of push-button slide changing, remote con-



trol, or timed automatic showing. A timer permits an entirely automatic 36-slide show, with the slides changing at any selected interval from three to 30 seconds. Also provided are pushbutton hold and reject controls and an air-actuated 15-ft. remote control unit.

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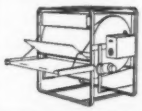

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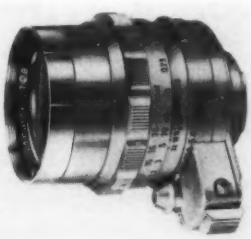
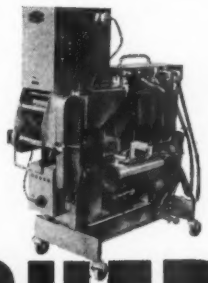


has an automatic diaphragm mechanism and focuses from infinity down to 4 in. There are seven stops from f/2.8 to f/22 and a setting for non-automatic operation. Price: $149.50.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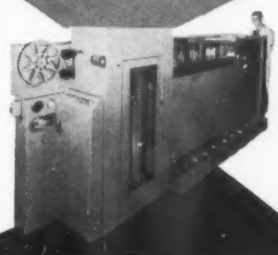
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The box required four standard porcelain sockets and number 10 and 4 asbestos-covered wire in addition to the metal for the sides. Overall dimensions are 18 x 20 x 6¾ in. Cost of construction: under $10.

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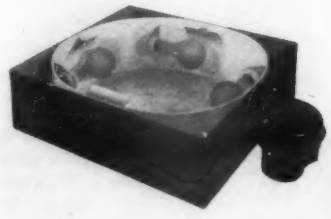

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REPRODUCTION

(*continued from page* 11)

While on the subject of electronic imaging devices, the Acme Teletronix Division, NEA Service, Inc., recently introduced the first commercial model of the redesigned Acme Color Separator. A rotary type scanner, the machine produces three-color and four-color separation negatives or positives from color transparencies and reflection-type art work up to 8 x 10 in. in size. The first commercial unit was installed at the Niagara Photoengraving Company, a subsidiary of the Buffalo (N.Y.) Courier-Express. The Courier-Express is stated to be the first American newspaper to produce editorial and advertising color by the use of scanned separation negatives produced in its own plant. A companion machine is in operation in NEA's News-In-Color laboratory in Cleveland. These facilities are available to the trade. The cost is $60 for a set of separations; three-color or four-color; positive or negative. Separations will be mailed back to the customer on the same day the color copy is received.

Figure 3 Acme Color Separator. The unit at left contains the scanning and recording sections. The cabinet at right houses the electronic circuits and controls for the entire system.

GRAPHIC ARTS DATA

The "Supplement to Kodak Graphic Arts Films and Plates Data Book," just published, describes the physical and photographic properties of films introduced to the graphic arts industry since the *Kodak Graphic Arts Handbook* was originally published. The insert is to be sent to registered owners of the handbook.

The 16-page supplement may be obtained without charge by writing the Sales Service Division, Eastman Kodak Co., Rochester, N.Y.

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ADVERTISERS' INDEX

SEPTEMBER 1958

ABBE FILMS & EQUIPMENT CO. 54
AGFA, INCORPORATED 16
AGOF SCHACHT LENS CORP. 19
ALLIED IMPEX CORP. 6
AMPHOTO 21, 67
ANKEN CHEMICAL & FILM CORP. 64
ANSCO DIVISION (General Aniline & Film Corp.) 5
ARISTO GRID LAMP PRODUCTS, INC. 54
ARKAY CORPORATION 18
AUDIO MASTER CORP. 54
AVERY COLOR LABS 14

BARON COMPANY, H. J. 46
BEATTIE-COLEMAN, INC. 20
BESELER CO., CHARLES, THE 51
BURKE & JAMES, INC. 63

CALUMET MFG. CO. 11
CAMERA EQUIPMENT CO. 21
CAMERA MART 64
CAMERA OPTICS MFG. CORP. 49
CAPITAL FILM LABORATORY ..... Second Cover
CAPROD, LTD. 17
COLIND PHOTOGRAPHY 64
COLORFILM, INC. 62
COMPO-PHOTOCOLOR 66
COPY ART 64

DA-LITE SCREEN COMPANY 48
DEETJEN COLOR LAB 66
DISTRIBUTOR'S GROUP, THE 64

EASTMAN KODAK CO. ..... 8-9, Fourth Cover
EDWAL SCIENTIFIC PRODUCTS CORP. 56

FILMLINE 65
FILM SOUNDS, INC. 65
FISHER COMPANY, OSCAR 65

GENERAL ELECTRIC CO., INC. 22
GOERZ AMERICAN OPTICAL CO., C. P. 50
GOLDBERG BROTHERS 49
GORDON ENTERPRISES 12
GRAFLEX, INC. 3

HAMILTON COLOR 65
HEILAND DIVISION (Minneapolis-Honeywell) ..... Third Cover
HEITZ, INC., KARL 13
HOLLYWOOD CAMERA COMPANY 65

IDEAX CORPORATION 55
INDUSTRIAL A-V EXHIBITION 52

JERI COMPANY, INC., ANDREW 54
JOHNKE MFG. COMPANY 64

KALART COMPANY, INC. 7
KIER PHOTO SERVICE 55
KIN-O-LUX, INC. 46
KLING PHOTO CORP. 64
KREONITE, INC. 56
KURSHAN, NORMAN 65
KURSHAN & LANG COLOR SERVICE, INC. 66

LACEY-LUCI PRODUCTS COMPANY 54
LAFAYETTE INSTRUMENT CO. 62
LECO, INCORPORATED 65
LENZ WASHER COMPANY 63
LOG ETRONICS, INC. 57

MANHATTAN COLOR LABS 54
MARSHALL MFG. CO., JOHN G. 19
MAYER COLOR LABS, INC., KURT 67
McNEAL ELECTRIC & EQUIPMENT CO. 65
MEISEL PHOTOCHROME CORP. 46
MICHIGAN PHOTO SHUTTER CO. 67
MICRO RECORD CORP. 55
MULSON STUDIO 66

NATIONAL STUDIO 63
NEGA-FILE COMPANY 10
NEMS-CLARKE, INC. 53
NEW YORK INSTITUTE OF PHOTOGRAPHY 67

PETERSON COLOR LABORATORY, INC. 63
PIERCE COMPANY 66
PLYMOUTH PRODUCTS CO., INC. 46
POLAROID CORPORATION 47

RADIANT MFG. CORP. 19
RAPID COLOR PRINT 67
READERS SERVICE 59-60
ROLOR INDUSTRIAL CORP. 14
ROSS-GAFFNEY, INC. 66

SAFE-LOCK, INC. 62
STILL-MAN EQUIPMENT CORP. 66

TAUBER PLASTICS, INC. 67
TRIANGLE PROJECTORS, INC. 55

VALENTINO, T. J. 66
VOSS PHOTO CORP. 49

WARD COLOR SERVICE, INC., JACK 67
WORLD-IN-COLOR PRODUCTIONS 68

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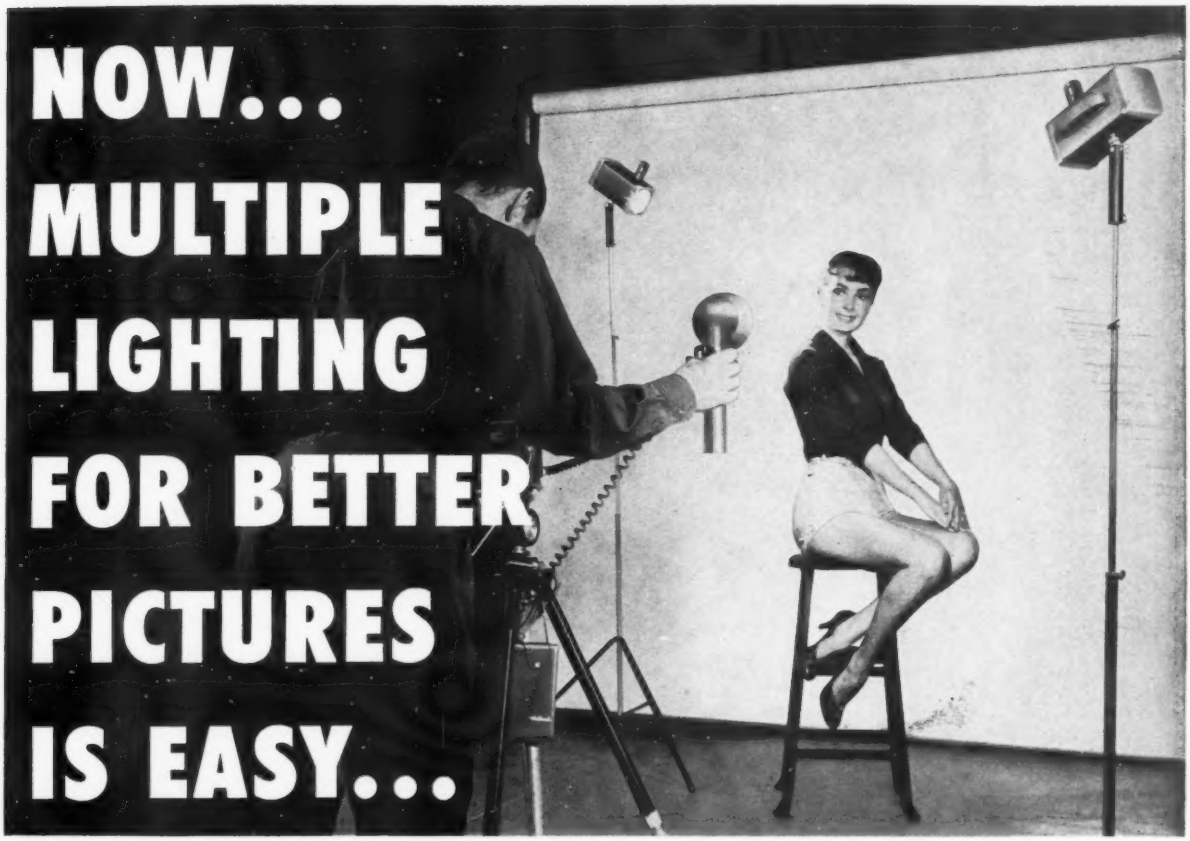

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Get more information. Circle 436, page 59

Kodak reports to industry

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